

MONTHLY WEATHER REVIEW.

VOL. XXII.

WASHINGTON, D. C., MARCH, 1894.

No. 3.

INTRODUCTION.

The REVIEW for March, 1894, is based on reports from 3,252 stations occupied by regular and voluntary observers. These reports are classified as follows: 152 reports from Weather Bureau stations; 42 reports from U. S. Army post surgeons; 2,238 monthly reports from State weather service and voluntary observers; 30 reports from Canadian stations; 221 reports through the Southern Pacific Railway Company; 565 marine reports through the co-operation of the Hydrographic Office, Navy Department, and "New York Herald Weather Service;" 5 weekly reports from 1 U. S.

Life-Saving station; no reports from navigators on the Great Lakes; monthly reports from local services established in all States and Territories; and international simultaneous observations. Trustworthy newspaper extracts and special reports have also been used.

The WEATHER REVIEW for this month has been prepared under the general editorial supervision of Prof. Cleveland Abbe. The statistical tables are furnished by the Division of Records and Meteorological Data, in charge of Mr. A. J. Henry, acting chief of that division.

CHARACTERISTICS OF THE WEATHER FOR MARCH, 1894.

HIGH AREAS.

The most important areas of high pressure were Nos. XVII and XVIII, which passed from Alberta on the 23d and 27th to the south Atlantic coast on the 28th and 31st, respectively. Coming as they did after several weeks of warm weather they brought disastrous frosts and freezes to the tender vegetation in the Mississippi Valley, Gulf, and south Atlantic States. The mean temperatures for the week preceding their advent and for the week following presented a remarkable contrast, so that many places have during this month experienced both the highest and lowest temperatures on record.

COLD WAVES.

The great cold wave of the 22d-27th, passing over Wyoming, caused a continuous blizzard of seventy hours at Buffalo, in that State, which, so far as known, was never approached in severity by any other storm in that locality.

LOW AREAS.

Several storms that have passed over the Lake region and New England have been quite severe, notably that of the 11th and 12th, but those off the coasts of Washington and Oregon and that of the 23d in the Atlantic Ocean, which passed from New England on the 22d, were among the severest on record.

PRECIPITATION.

A special area of heavy rainfall occurred during the 15th and 21st in Arkansas and Louisiana and a notable snowfall over the Appalachian Range and New England on the 25-30th.

RIVER FLOODS.

Notable floods or high waters were reported from Baker City, Oreg., as also from Arkansas and Louisiana.

AURORAS.

A brilliant and interesting aurora occurred on the 30th, accompanied by a remarkable magnetic storm; both of these phenomena were also observed in Europe on that date.

ATMOSPHERIC PRESSURE.

[In inches and hundredths.]

The distribution of mean atmospheric pressure reduced to sea level for March, 1894, as determined from observations taken daily at 8 a. m. and 8 p. m. (seventy-fifth meridian time), is shown by isobars on Chart II, which also gives the so-called resultant wind direction for this month; these resultants are also given numerically in Tables VIII and IX of the present REVIEW. The pressures here charted are those shown by mercurial barometers uncorrected for the effect of the variation of gravity with latitude; this correction is shown by the numbers printed on the border of Chart II; it should be applied and new isobars drawn by those engaged in special researches.

During March the pressures at sea level have been highest, 30.20, in southeastern Georgia and northern Florida; a minor region of maximum pressure, 30.11, existed off the coast of

northern California. The regions of minimum pressure were 29.90, or less, in British Columbia; 29.93 over Lake Superior and eastward; 29.94 over the Gulf of California and northward to southern Nevada.

The normal distribution of atmospheric pressure and normal resultant wind direction for the month of March were approximately shown on Chart VIII of the REVIEW for March, 1893, as computed by Prof. H. A. Hazen, and are not now reproduced. As compared with the normal for March, the mean pressure for the current month was in excess in the Atlantic and Gulf States, lower Lake region, and Ohio Valley; also slightly in excess in northern California, but deficient throughout the interior of the country. The line of no departure passes from eastern Texas through Arkansas, Indiana, and southern Michigan northeast toward Labrador.

The principal excesses were: 0.10 or 0.12 at middle and southern Atlantic coast stations; 0.13 at Halifax, N. S.; and 0.04 at San Francisco and Eureka, Cal. The principal deficits were: 0.15 at Prince Albert, Saskatchewan; 0.14 at St. Vincent, Minn.

As compared with the preceding month of February, 1894, the mean pressure for March was lower at all stations, except about stationary in the region from Virginia to northern Florida. The principal area of lower pressure was -0.20 to -0.27 in Idaho, Utah, Wyoming, Colorado, Kansas, Nebraska, and the eastern part of South Dakota. The line of fall of 0.10 passes from British Columbia southward, parallel to the coast, into Mexico, and from eastern Texas northeast to the mouth of the Saint Lawrence.

The systematic periodic diurnal variations of pressure are shown by the hourly means given in Table VI.

MOVEMENTS OF CENTERS OF AREAS OF HIGH AND LOW PRESSURE.

The following table shows the date and location of the center at the beginning and ending of each area of high or low pressure that has appeared on the U. S. Weather Maps during the month, together with the average daily and hourly velocities. The monthly averages will differ accordingly as we consider each path as a distinct unit, or give equal weight to each hour of observation; in the first case the monthly average is taken by paths, in the latter case by hours:

Movements of centers of areas of high and low pressure.

Number.	First observed.			Last observed.			Path.		Average velocities.	
	Date.	Lat. N.	Long. W.	Date.	Lat. N.	Long. W.	Length.	Duration.	Daily.	Hourly.
High areas.										
I.	1, a. m.	42	110	1, a. m.	42	110	0	0.0	0.0	0.0
II.	2, a. m.	28	87	5, a. m.	34	77	1,800	3.0	600	25.0
III.	2, p. m.	53	115	6, a. m.	52	101	1,100	3.5	314	13.1
IV.	4, p. m.	37	114	5, p. m.	33	114	400	1.0	400	16.7
V.	6, a. m.	41	116	8, a. m.	39	94	1,500	2.0	750	31.2
VI.	8, a. m.	39	118	8, p. m.	37	116	150	0.5	0.0	0.0
VII.	8, a. m.	41	90	10, a. m.	45	59	1,850	2.0	925	38.5
VIII.	9, p. m.	42	125	12, a. m.	38	111	1,100	2.5	440	18.3
IX.	13, a. m.	37	125	14, p. m.	39	125	400	1.5	267	11.1
X.	13, p. m.	30	85	15, a. m.	42	74	950	1.5	633	26.4
XI.	16, a. m.	28	80	16, p. m.	28	80	0	0.0	0.0	0.0
XII.	17, a. m.	43	76	18, p. m.	44	59	700	1.5	467	19.5
XIII.	16, p. m.	44	126	18, a. m.	40	113	800	1.5	533	22.2
XIV.	18, a. m.	54	103	21, p. m.	47	58	1,100	2.5	440	18.3
XV.	18, p. m.	45	128	19, a. m.	43	125	200	0.5	0.0	0.0
XVI.	19, a. m.	54	118	23, a. m.	41	111	1,200	4.0	300	12.5
XVII.	23, a. m.	55	115	28, a. m.	37	73	1,950	5.0	390	16.2
XVIII.	27, a. m.	55	114	31, p. m.	29	78	3,050	4.5	678	28.2
XIX.	30, a. m.	47	127	31, p. m.	42	113	700	1.5	467	19.5
Sums							18,750	39.0	7,604	.....
Mean of 15 paths									507	21.1
Mean of 39.0 days									481	20.0
Low areas.										
I.	1, a. m.	30	79	1, a. m.	30	79	0	0.0	0.0	0.0
II.	1, a. m.	50	89	3, p. m.	46	57	2,050	2.5	820	34.2
III.	1, a. m.	53	115	7, p. m.	53	63	4,100	6.5	631	26.3
IV.	2, p. m.	32	119	2, p. m.	32	119	0	0.0	0.0	0.0
V.	5, a. m.	47	126	8, a. m.	37	77	2,900	3.0	967	40.3
VI.	6, p. m.	54	113	6, p. m.	54	113	0	0.0	0.0	0.0
VII.	6, p. m.	43	129	12, a. m.	51	59	4,000	5.5	727	30.3
VIII.	7, p. m.	37	104	9, a. m.	33	96	800	1.5	533	22.2
IX.	12, p. m.	45	92	15, a. m.	48	55	2,100	2.5	840	35.0
X.	12, a. m.	33	78	12, a. m.	33	78	0	0.0	0.0	0.0
XI.	13, p. m.	31	114	14, p. m.	38	100	1,050	1.0	1,050	43.8
XII.	13, p. m.	55	115	17, a. m.	47	55	3,100	3.5	886	32.8
XIII.	15, a. m.	52	120	20, a. m.	45	55	3,400	5.0	680	28.3
XIV.	18, a. m.	51	124	23, p. m.	47	71	4,050	4.5	900	37.5
XV.	22, p. m.	44	86	24, a. m.	44	57	1,850	1.5	1,233	57.4
XVI.	18, p. m.	39	99	20, p. m.	38	96	900	2.0	450	18.8
XVII.	21, p. m.	46	71	22, a. m.	42	61	550	0.5	0.0	0.0
XVIII.	23, a. m.	39	115	25, a. m.	30	115	0	0.0	0.0	0.0
XIX.	23, p. m.	49	95	25, a. m.	53	65	1,600	1.5	1,066	44.4
XX.	25, p. m.	44	67	26, a. m.	43	56	650	0.5	0.0	0.0
XXI.	27, p. m.	40	100	30, a. m.	47	59	1,500	2.5	600	25.0
XXII.	28, p. m.	53	124	31, p. m.	52	84	1,200	3.0	400	16.7
Sums							35,800	49.0	11,783	.....
Mean of 16 paths									743	31.0
Mean of 49.0 days									730	30.4

HIGH AREAS.

I.—This appeared on the morning of the 1st, central in Wyoming, and was the continuation of low area No. VII of the month of February. It had no further motion, and must be considered as having merged into high area No. III. In connection with this area warning of a marked fall in temperature was sent on the 2d, 10 a. m., to Helena and Fort Custer, Mont., and Williston and Bismarck, N. Dak.

II.—Was central on the morning of the 2d in the eastern portion of the Gulf of Mexico; it moved northward into Ohio and thence slowly southeast and disappeared on the 5th off the coast of North Carolina.

III.—This area was nearly central in Alberta on the morning of the 3d, and had apparently moved southeastward on the eastern slope of the Rocky Mountains from Athabasca, while low area No. III was far to the south and moving eastward. By the 6th, a. m., the highest pressure had moved southeast into Manitoba, after which it can not be traced on our maps. In advance of this area cold wave signals were ordered as follows: 2d, p. m., North Dakota, South Dakota, Nebraska, Kansas, Minnesota, and Iowa. 3d, a. m., Wyoming and South Dakota; 3d, p. m., Wyoming, Colorado, Nebraska, Minnesota, Iowa, and Wisconsin. 4th, a. m., Kansas, Iowa, and Wisconsin; 4th, p. m., Nebraska, Texas, Minnesota, Iowa, and Wisconsin. 5th, a. m., Kansas, Oklahoma, Indian Territory, Texas, Iowa, Missouri, Arkansas, Illinois, Michigan, and Wisconsin. 6th, a. m., Michigan, Indiana, Ohio, Kentucky, Pennsylvania, and West Virginia. 7th, a. m., Vermont.

IV.—This area appeared on the 4th, p. m., in southern Nevada and disappeared on the 5th, p. m., in New Mexico. Although it appeared at first to be pushing northeastward over southern California, yet it is allowable to consider it as a southern branch from high area No. III, and, therefore, consisting of cold air flowing southward to the Gulf of California.

V.—This area appeared on the 6th, a. m., in northern Nevada, where it also disappeared the same day.

VI.—This appeared on the 8th, a. m., in Nevada and disappeared on the same day.

VII.—This appeared on the 8th, a. m., in Illinois, and subsequently, by joining a larger area in Canada, appeared to have moved northeastward. The combined area disappeared on the 10th, a. m., off Cape Breton.

VIII.—Appeared first on the 9th, p. m., off the coast of northern California; moved slowly southeastward, and on the 12th diffused northward and southward over the Rocky Mountain region and disappeared. Cold wave signals were ordered on the 10th, a. m., for Colorado, Nebraska, Kansas, and Iowa; 10th, p. m., Wisconsin.

IX.—This appeared off the coast of northern California on the 13th, a. m., pushed slowly northeastward during the 13th and 14th, then retired southwest and disappeared.

X.—Appeared on the 13th, p. m., north of Lake Superior, moved southeast and disappeared on the 15th, a. m., on the middle Atlantic coast. Cold wave signals were ordered on the 14th, a. m., for Vermont.

XI.—Pressure rose steadily over southern Florida from the 12th, p. m., to the 16th, a. m., and on the latter date high area No. XI may be considered as central in this region and as tributary to low area No. XIII, which was then central in Assiniboia, while high area No. XIII was approaching the coast of Oregon. During the 16th pressure began to fall in Florida, but to rise in the Middle States and New England, but this new high area, No. XII, must be considered as independent of No. XI.

XII.—This was central on the 17th, a. m., in central New York and 17th, p. m., south of Long Island, after which it moved northeast and disappeared on the 18th, p. m., off Nova Scotia.

XIII.—Appeared on the 16th, p. m., west of Oregon; pushed northeast and then southeast until, on the 18th, a. m., it was central in northern Utah, while a similar high area was central north of Manitoba; these two formed part of a belt of high pressure on the south and east sides of low area No. XIV, which was then central in British Columbia.

XIV.—Slight rise of pressure occurred in Saskatchewan on the 17th, and on the 18th, a. m., the highest pressure was central in the northwestern part of Manitoba; it moved southeastward, keeping north of the Great Lakes, and disappeared on the 21st, p. m., south of Newfoundland.

XV and XVI.—The map of the 19th, a. m., shows a sudden rise of pressure, or high area No. XV, on the coast of California, Oregon, Washington, as also in Alberta and probably Athabasca, while high area No. XIV was already moving southeastward over Manitoba. This general rise of pressure followed the southeast movement of low area No. XIV, over Montana. It seems plausible that high area No. XV was west of Oregon on the 18th, p. m., and pushing northeastward, although the trend of our Pacific coast intersected its isobars in such a way as to make an apparent increase of pressure progress southward along the coast. Cold wave signals were ordered 20th, a. m., for South Dakota; 20th, p. m., Nebraska, Kansas, and Iowa. 21st, a. m., South Dakota, Kansas, Oklahoma, Indian Territory, Minnesota, Iowa, Missouri, and Wisconsin. Another inflow of cold air from the northward may have contributed to the formation of the other area of high pressure, No. XVI, which appeared on the 19th, a. m., in northwestern Alberta. High area No. XV behaved as a mass of air banked up on the western side of the Rocky Mountain and Sierra ranges, while high area No. XVI moved south and obliterated high area No. XV. This was the most extensive and well-defined area of high pressure during March. By the 23d, a. m., the central highest had moved southeast over Assiniboia, and thence southwest into Utah, while the outflow of cold air had at that time extended as a norther over Texas and the Gulf of Mexico, and also as a cold, dry easterly wind, with frost, over California, Oregon, and Washington. The blizzard in Wyoming attending this high area lasted 70 hours and was more severe than any of previous record. As usual, this advance of such an extensive high area was also attended by the development of low pressure in Mexico, and its gradual extension northward into southern California and Texas; undoubtedly, the area of low pressure characteristic of the Gulf of California, and which we have before described as a branch of the equatorial trough, was now rapidly advancing northward off the Pacific coast of Mexico, and by the 23d, a. m., the northern end of this area of low pressure had reached Yuma, Ariz., and retained its position during the rest of the month. After the 23d and as the temperature rose over the Rocky Mountain plateau region pressure fell at the high stations, but a second high area immediately followed in Alberta.

XVII.—After a slight fall on the 22d pressure again rose in British Columbia and Alberta on the 23d, a. m. This center moved slowly eastward, but its northerly winds and rising pressure extended rapidly southward to the Gulf of Mexico, and the area of high pressure became a ridge whose southern end covered Mexico while its northern end reached far northward into British America, apparently beyond N. 60°. If the isobar of 30.6 marked the position of the crest of an extensive wave in the upper atmosphere moving slowly eastward, or if it was simply a branch protruding from the great area of high pressure in Asia, or if it was simply the locus of the intersection, at the earth's surface, of a broad sheet of descending air, or if, finally, we view it as the locus of a standing wave or nearly stationary system of anticyclonic circulation, still, in either case, it must have had an intimate dependence upon the obstruction offered by the Rocky Moun-

tain range. By the 27th, a. m., this area had divided into a northern and southern portion, respectively, central in Alabama and the upper Lake region; the latter disappeared on that date, but the former continued eastward, as usual, and disappeared on the 28th off the middle Atlantic coast.

In connection with this high area special warnings of frosts and low temperature for Alabama, Mississippi, Louisiana, Texas, eastern New York, eastern Pennsylvania, Maryland, Virginia, and West Virginia were sent out at 10 a. m. of the 25th.

Cold wave signals were ordered as follows: 24th, a. m., Iowa, Missouri, Illinois, and Michigan; 24th, p. m., Arkansas, Illinois, Ohio, Kentucky, Tennessee, New York, western Pennsylvania, eastern Pennsylvania, Maryland, District of Columbia, Virginia, and Georgia. 25th, a. m., Louisiana, Mississippi, Alabama, New York, Vermont, North Carolina, South Carolina, and Georgia. 24th, 11 p. m., northeast wind signals were ordered for Corpus Christi and Galveston, Tex., and information signals at Port Eads and New Orleans, La. 25th, 10 a. m., northwest signals at Milwaukee, Wis., and Grand Haven, Mich., also for Port Eads and New Orleans, La., Mobile, Ala., and Pensacola, Fla., and information signals at Cedar Keys, Fla. 26th, 10 a. m., northwest signals were ordered for the entire coast from Cedar Keys, Fla., to Eastport, Me.

XVIII.—On the 26th, p. m., pressure was falling in Alberta and British Columbia, but this was followed immediately by a rise, especially on the east side of the Rocky Mountains, and on the 27th, a. m., pressure had risen to 30.62, or 0.36 in twelve hours, at Edmonton, Alberta, with light winds and clear weather, while at Seattle, Wash., it had risen only 0.02. The area of high pressure thus announced moved rapidly southeast along the eastern slope, while low area No. XX developed to the southward. It was central in Texas on the 29th, a. m., after which the highest pressure moved eastward and disappeared on the 31st east of Florida. Cold wave signals were ordered, 27th, p. m., in Colorado, Nebraska, Kansas, Oklahoma, Indian Territory, Texas, and Missouri, and 28th, a. m., Texas, Minnesota, Iowa, Missouri, Arkansas, Wisconsin, Illinois, and Tennessee.

XIX.—This appeared to have been west of Oregon on the 30th, a. m., and to have extended eastward into Idaho in connection with low area No. XXI, which was then in Assiniboia. It reached the southeastern corner of Idaho on the 31st, a. m., and its subsequent history belongs to the month of April.

LOW AREAS.

I.—This area appeared on the 1st, a. m., east of Florida, but its further history belongs to the Atlantic Ocean.

II.—1st, a. m., was north of Lake Superior, moved rapidly eastward, and on the 2d, p. m., was at the mouth of the St. Lawrence; it appeared then to have turned rapidly southeast, as a low was central on the 3d, a. m., near Halifax, N. S., but this may have been a junction with low area No. I. 3d, p. m., was central south of Newfoundland, after which it disappeared from our maps.

III.—Central the 1st, a. m., in the northern part of Alberta, having apparently come southeast through British Columbia, moved slowly southeast, and on the 2d, p. m., was central in Manitoba, while a trough of low pressure reached southwest into Idaho, and high area No. III followed rapidly behind. This trough then moved southwestward, and on the 3d, p. m., was central in southwest Wyoming. On the 4th, p. m., the lowest pressure extended as a narrow trough from Kansas through central Minnesota and the western portion of Lake Superior into Lake Ontario, while the extensive high areas, Nos. III and II, were central in Saskatchewan and off Cape Hatteras, N. C., respectively. By the 5th, a. m., the southern end of this trough had partly filled up, and the lowest pressure was

central in Minnesota; as this center passed slowly eastward high southwest winds and rain prevailed in the lower Lake region. The low pressure disappeared on the 7th, p. m., over the Gulf of St. Lawrence. In connection with this area wind signals were ordered on the 4th, 11 p. m., at Grand Haven, Mich., and along the Gulf coast from Corpus Christi, Tex., to Port Eads, La., and information signals from Mobile, Ala., to Key West, Fla. On the 6th, when the storm center was over Lake Huron, signals were ordered for southwest winds from Norfolk, Va., to Boston, Mass., and at 11 p. m. information signals at Portland and Eastport, Me. 4th, 10 p. m., while the trough of low pressure was central in Kansas, the following special warning was sent: "Severe local storms for Illinois and Missouri." On the 6th, 11 a. m., when the low trough was in Michigan, the following special warning was sent: "Marked fall in temperature to about freezing in Tennessee and Kentucky."

IV.—On the 2d, p. m., pressure had fallen in Arizona and southern California, and the low area peculiar to that region spread northward until, on the 3d, a. m., it had joined low area No. III, forming a trough of low pressure. On the 4th, a. m., pressure had risen in California and Arizona, and the trough became an area of low pressure, which has been described as low area No. III.

V.—On the 5th, a. m., pressure had fallen on the coast of Washington and Oregon, and by the 5th, p. m., a well-defined low area was central in Washington. This spread rapidly southeast and had disappeared entirely in that region by the 6th, a. m., but a trough of low pressure seems to have resulted on the eastern slope of the Rocky Mountains, so that on the morning of the 6th, a. m., a slight depression was central between Wyoming and North Dakota, while another and deeper depression existed simultaneously in Alberta and Athabasca. On the 6th, p. m., the southernmost of these depressions, which is called No. V, had moved southeast into Oklahoma and the northernmost, which is called No. VI, was in northern Alberta. The latter soon disappeared in the presence of a larger depression to the westward, while the southern area continued to develop. On the 7th, a. m., the latter was central in Missouri; 7th, p. m., in Kentucky; 8th, a. m., in Virginia, where it disappeared.

VI.—Appeared on the 6th, p. m., in northern Alberta. The limited area covered by our weather maps prevents us from ascertaining whether this is to be regarded as the northwestern portion of a trough transferred across the Rocky Mountains from low area No. V, or whether it was a forerunner of low area No. VII; if the latter be true its appearance would be entirely analogous to numerous cases in more southern latitudes, where a low approaching the Rocky Mountains expands into a larger area over the plateau, out of which there forms a depression on the eastern slope far to the southeast of the original low.

VII.—On the 6th, p. m., pressure began to fall on the coast of Oregon, Washington, and northern California, and on the 7th, a. m., a low area was central in British Columbia, having evidently moved east or northeastward from the Pacific. By the 7th, p. m., this center was on the Rocky Mountain Divide, between British Columbia and Alberta, and by the 8th, p. m., had passed entirely over, and the lowest pressure, 29.00, was at Edmonton, Alberta; meanwhile, the area of falling barometer had extended rapidly to the southeast and a minor depression was central in Texas. An area of low barometer had at no time passed over the southern portion of the Rocky Mountain plateau in such a way as to indicate that the low pressure on the eastern slope of the Rocky Mountains had passed across the whole length of that range as a long trough of low pressure, but, on the contrary, the low pressure on the eastern side from Texas to Montana must be attributable, in some way, to the movement of the winds

toward the low pressure in Athabasca and Saskatchewan. By the 9th, p. m., the area of lowest pressure, or isobar of 29.45, extended as a long oval from Alberta eastward through Montana, while the larger depression, of which this was the center, extended from Mexico northward beyond our stations; out of this large region a special area of low pressure and cyclonic whirl was developed which was central in eastern Nebraska on the 10th, a. m., and therefore, as usual, far south of the center of the larger depression. This developed into a violent storm moving northeastward over Wisconsin and Lake Superior, thence eastward into Labrador, where it disappeared on the 12th.

In connection with this storm center, wind signals for southwest winds were ordered on the 10th, 2 p. m., at Milwaukee, Wis., and Grand Haven, Mich., and changed at 10.30 p. m. to northwest signals. On the 11th, at 10.30 a. m., southeast winds were signaled from Sandy Hook, N. J., to Eastport, Me., but at 10.30 p. m., were changed to southwest signals.

VIII.—This slight depression appeared on the map on the 7th, p. m., in Colorado, at the southern extremity of the depression produced by low area No. VII. During the 8th pressure continued to fall in the southwest, and on the 8th, p. m., this depression was in central Texas, while brisk, cool northwest winds prevailed on the south and east Rocky Mountain slope from high area No. VI, which was then central in Nevada. By the 9th, a. m., this depression had filled up and disappeared on the southern border of Oklahoma.

IX.—During the 11th the barometer continued low throughout the region from Washington to Manitoba and northward, while low area No. VII was moving eastward toward Labrador; minor areas of low pressure appeared on the 11th and 12th in Alberta and Saskatchewan and in Wisconsin, forming a belt of low pressure which had disappeared by the 12th, p. m., leaving a definite area, No. IX, central in Wisconsin. This moved eastward over lakes Michigan, Huron, and Ontario, developing rapidly as a severe storm center. It was central on the 13th, p. m., near Oswego, N. Y., and on the 14th, a. m., near Northfield, Vt., and on the 14th, p. m., was near the coast of Nova Scotia, and disappeared on the 15th, a. m., in Newfoundland. On the 13th information signals were displayed from Sandy Hook, N. J., to Eastport, Me.

X.—On the 12th, a. m., a depression appeared on the south Atlantic coast; it gave every appearance of being the western edge of a revolving storm central far to the eastward, and its further history belongs to ocean meteorology. On the 12th, 10 p. m., information signals were displayed from Savannah, Ga., to Wilmington, N. C.

XI and XII.—On the 13th, a. m., pressure had fallen slightly in California southeastward over Mexico, Texas, and Arkansas, and by the 13th, p. m., it was evident that a general depression was advancing northeastward from the Pacific over northern Mexico, while at the same time another, No. XII, was advancing rapidly southeastward from British Columbia, Athabasca, and Colorado. Nothing can more vividly illustrate the unstable condition and the turbulent movement of the atmosphere during its transition from winter to summer than these great changes of pressure over such large areas. This extended depression maintained its existence during the 13th, but was rapidly modified during the 14th. The definite area of low pressure, No. XI, was located in central Texas on the 13th, p. m., and in Oklahoma on the 14th, p. m., as the southern end of a trough trending north and south and having low area No. XII near its center in the eastern part of North Dakota. During the 14th and 15th low area No. XI moved eastward, diminishing in importance, and finally disappearing on the middle Atlantic coast. No. XII having stretched southward on the 14th rapidly recovered on the 15th; it was central on the 15th, a. m., near Lake

Superior, after which it passed eastward, with high southerly winds in the Lake region, and disappeared on the 17th, a. m., over Newfoundland.

In connection with these areas, southeast winds were signaled at Corpus Christi, Tex., on the 13th, 11 p. m.; also at Portland and Eastport, Me., 14th, 10 a. m., and Milwaukee, Wis., 10 p. m.; northwest winds at Delaware Breakwater and Atlantic City, N. J., 14th, 11 a. m.; and from Sandy Hook, N. J., to Boston, Mass., 14th, 10 a. m. On the 15th, 10 a. m., southwest winds at Grand Haven, Mich., and at 10 p. m., information signals from Sandy Hook, N. J., to Boston, Mass.

XIII.—On the 14th, p. m., pressure began to fall in British Columbia, and on the 15th, a. m., low area No. XIII was central in that region, having apparently moved southeastward along the Rocky Mountain range; it continued in that direction until the 17th, a. m., when it was central in South Dakota, and represented a very large depression trending northeastward to Hudson Bay and southwest beyond Mexico, while an equally extensive area of high pressure, No. XIII, was advancing eastward upon the Pacific coast. On the 18th the center passed northeast over Lake Michigan attended by high winds. On the 19th, p. m., the storm was central in the Gulf of St. Lawrence, and on the 20th it passed south of Newfoundland, and its subsequent history belongs to the Atlantic Ocean.

In connection with this storm center, northwest winds were signaled on the 19th, 10 p. m., from Narragansett, R. I., to Eastport, Me.

XIV and XV.—After a slight rise the pressure again fell in British Columbia, and on the 18th, a. m., low area No. XIV was apparently central in that province. This moved rather rapidly southeastward, and on the 19th, a. m., was central in southeastern Montana, while at the same time pressure had fallen southwestward over the central Rocky Mountain plateau, and a depression, No. XV, had also passed from the Gulf of California to Texas. The former, No. XIV, moved slowly southward into Colorado and western Kansas where it remained nearly stationary, while the latter moved slowly northward, and both united on the 21st, a. m., in the latter State.

On the 18th, while high area No. XIII extended as a ridge from Manitoba south and west into California, the northerly winds of New Mexico and western Texas seem to have conspired with the southeast winds of the eastern portion of Texas in developing a low area, No. XV, in the region between them, and this was central near San Antonio, Tex., on the 18th, p. m.; it had partly filled up by the 19th, a. m., but again developed rapidly during that day, moving slowly into eastern Texas, where high southeast winds prevailed on the 19th, p. m. At this date we have, therefore, two independent storm centers in Colorado and Texas, respectively, the former attended by lighter winds, but the latter attended on the northern side by heavier winds and on its eastern side by rain. As before stated, low area No. XV moved slowly northward into Kansas, while No. XIV moved southward into the same State, and on the 20th, p. m., these had united into an important storm center in that region. On the 21st, a. m., high northerly winds, with snow, prevailed over Colorado, Nebraska, North and South Dakota, Minnesota, and Lake Superior, while warm southerly winds, with rain, prevailed eastward to the middle Atlantic States; a belt of strong thermal and barometric gradients extended from New Mexico to Manitoba.

On the 21st, p. m., the combined storms were central in northwestern Iowa, with high winds on all sides, except in a small region to the southeast. On the 22d, a. m., the principal depression was central in southern Minnesota and a minor depression, with cyclonic whirl, had apparently formed in extreme northern Indiana, but this latter soon disappeared

and the main storm center moved eastward across lakes Michigan and Huron and was central near the latter on the 23d, a. m., while high westerly winds prevailed over the Lakes and a southeast storm prevailed on the middle and east Atlantic coasts. During the night of the 22-23d the central depression divided into two portions, of which the principal one, No. XIVa, passed over the middle Atlantic States and northeastward along the coast, while the original but now the minor area, No. XIV, passed from Lake Huron into Labrador and disappeared. The new storm center, No. XIV, passed south of Newfoundland on the 24th, a. m., and its further history belongs to the Atlantic Ocean.

In connection with these centers southeast winds were signaled on the 19th, 10 p. m., from Port Eads, La., to Pensacola, Fla., and information signals at Cedar Keys and Key West, Fla., and Corpus Christi, Tex. 20th, 2 p. m., southeast winds at Grand Haven. 21st, 11 p. m., information signals at Grand Haven, Mich. 23d, 11 a. m., southeast wind signals from Norfolk, Va., to Eastport, Me. 23d, 11 a. m., the following special warning was sent to the secretaries of the Maritime Exchanges at New York and Philadelphia: "Severe storm on the Atlantic coast."

XVI.—On the 21st, p. m., a small whirl and depression seem to have developed in the St. Lawrence Valley at the extreme northeast end of the trough containing low areas Nos. XIV and XV. This whirl developed in extent, and on the 22d, a. m., was apparently central south of Nova Scotia, where it disappeared from our maps.

XVII.—On the 22d, p. m., while high area No. XVI was advancing over the Rocky Mountain plateau region, a decided depression was manifest south of Arizona, which was evidently a reappearance of the low area peculiar to the Gulf of California and the adjacent Pacific Ocean; although it soon filled up, this area reappeared twice during the remainder of the month and, as usual, always in connection with the movement of high areas on the Rocky Mountain plateau, as though the northward advance of low areas from the equatorial belt of the Pacific, toward Arizona, was immediately followed by a corresponding advance of high areas southward toward the same region.

XVIII and XIX.—On the 23d, p. m., while high area No. XVII was central in Saskatchewan, the high, cold, northerly wind on its eastern border seems to have developed the low area No. XVIII which was then central in southern Manitoba. We have no observations to show the earlier history of this depression and, indeed, it is quite likely to have rapidly developed on that date in northern Manitoba, so that its course was first toward the south-southeast until midnight of the 23d, after which it turned eastward and by the morning of the 24th was central at the eastern end of Lake Superior. High westerly winds and snow prevailed that day over the Lake region. During the 25th the center moved down the St. Lawrence Valley and disappeared at 8 p. m. in Labrador, while a new depression, No. XIX, developed off the New England coast as soon as the cold northwesterly winds reached that region, and passed northeastward on the 26th south of Newfoundland, developing on the 27th into a severe storm whose history belongs to the Atlantic Ocean. On the 24th, 10 a. m., information signals were displayed from Sandy Hook, N. J., to Eastport, Me., and northwest wind signals at Grand Haven, Mich.

XX.—During the 27th the cold northerly winds on the north side of high area No. XVIII, then central in Assiniboia, and the southerly winds from high area No. XVII, central in the Gulf States, met on the east Rocky Mountain slope, and out of the moderate depression that had previously existed, developed a well-marked area of low pressure with cyclonic winds that, on the 27th, p. m., was central in western Kansas; this moved eastward, accompanied by high winds, low tem-

peratures, and snow, but the central barometric readings, which were at no time low, except by comparison with the surrounding highs, suddenly rose, and on the 29th, a. m., had become a trough with a pressure of about 30.05 in western New York and Pennsylvania. On the 29th, p. m., however, as this trough passed to the Atlantic Ocean, it developed into a storm center that moved northeastward, and, on the 30th, a. m., was central between Newfoundland and Cape Breton.

Information signals were ordered on the 27th, 10 p. m., at Corpus Christi and Galveston, Tex., and northwest signals on the 28th, 1.30 p. m., at the same places; on the same date, at 10 p. m., northwest signals were ordered from Port Eads, La.,

to Pensacola, Fla., and on the 28th, 10.40 a. m., southeast wind signals at Grand Haven, Mich.

XXI.—On the 28th, p. m., low pressures developed on the Pacific coast, both in the Gulf of California and in British Columbia. The latter moved eastward, reaching Manitoba on the 30th, a. m., and Minnesota on the 30th, p. m., after which it turned northeast and passed through Canada north of our stations, but accompanied by high southwest winds over the Lake region on the 31st.

On the 30th, p. m., information signals were ordered for Grand Haven, Mich., and on the 31st, 10.30 a. m., northwest signals for the same place.

NORTH ATLANTIC METEOROLOGY.

[Pressure in inches and millimeters; wind-force by Beaufort scale.]

The normal barometric pressure for March over the North Atlantic Ocean, as deduced from international simultaneous observations, is highest, 30.10 to 30.16 (764 to 766), in a belt extending from the west coast of Africa into Florida, between parallels N. 20° to N. 30°; a corresponding belt prevails on the Pacific Ocean west of the peninsula of lower Florida. The region of lowest pressure, 29.65 to 29.70 (752 to 754), includes Iceland and the southern end of Greenland; a still lower area of low pressure apparently exists between North Cape and Nova Zembla; in the Pacific Ocean the lowest pressure extends from the southern point of Alaska westward over the Aleutian Islands. An area of high pressure between the Rocky Mountains and Hudson Bay, and connected with the high pressure of northern Siberia, separates the low areas of the Atlantic and the Pacific. The general distribution of the pressure is, therefore, symmetrical, not with respect to the north pole and the equator, but rather to a line drawn from Manitoba to the Sea of Baikal, in Siberia. These pressures are as given by the mercurial barometer, uncorrected for the variation of gravity with latitude.

As compared with February the normal pressure for March is lower by 0.10 in Manitoba, Assiniboia, and Saskatchewan, as also along the middle and east Atlantic coasts to Newfoundland and the mouth of the St. Lawrence, but it is higher by 0.15 over Greenland, Iceland, Ireland, Spitzbergen, and the intermediate ocean.

The departures of normal monthly pressure for March from the annual normals for the Northern Hemisphere show a deficit of 0.10 over the Atlantic southeast of Nova Scotia and Newfoundland, and, therefore, decidedly south of the region of lowest pressure; this location to the southward is, to a considerable extent, explained as the effect on the mercurial barometer of the variations of gravity with latitude.

The tracks pursued by storm centers, as well as their average velocity and frequency, differ but little from those of February. The regions over which the greatest number of storm centers pass are as follows: 43 near Lake Superior; 44 between Cape Cod and Nova Scotia; 34 east of Newfoundland, at about N. 47°, W. 45°; 20 between Iceland and the Orkneys; also in northern Norway and Sweden and in central Italy. The average velocity of movement for the United States is 33 miles per hour, and for the North Atlantic Ocean 22 miles from west to east. On the average one storm traverses successively both the North American continent, the Atlantic Ocean, and Europe during the month of March.

NORTH ATLANTIC STORMS.

The paths of the following areas of low pressure and strong winds on the Atlantic Ocean during March, 1894, have been approximately traced on daily charts of simultaneous observations received through the co-operation of the Hydrographic

Office, U. S. Navy, and the "New York Herald Weather Service:"

A. Central, 1st, Greenwich noon, N. 60°, W. 8°, and was a continuation of area L in the series for February. Pressure was at this time high over southern Europe and the entire Atlantic south of N. 45°, and continued high in the eastern portion of this region for several days; 2d, noon, central N. 62°, W. 4°; 3d, noon, N. 65°, E. 22°; 4th, noon, N. 65°, E. 50°; the central lowest pressure had by this time steadily risen, and having passed into the region of the Ural Mountains, was probably entirely broken up.

B. This represents the western portion and a subdivision of area A, and probably originated on the 3d south of Iceland, and in the usual manner by the inflow of cold, northwest winds into the southwest end of a general depression; it was central, 4th, noon, at N. 62°, W. 5°; 5th, noon, in southern Sweden and the Baltic Sea, where it disappeared.

C. This was a continuation of U. S. series No. II. On the 2d a depression existed between the Atlantic coast and Bermuda, approximate location of its center, N. 32°, W. 32°; 3d, noon, N. 42°, W. 57°; by this time it had developed into a severe hurricane; 4th, noon, N. 43°, W. 52°; 5th, noon, the center had apparently rapidly filled up and only a slight depression was left at N. 44°, W. 48°, while a more important trough of low pressure was developing to the northward. The *Edam*, at 7 p. m., was at N. 41° 47', W. 57° 21', barometer 28.92.

D. This depression was central on the 6th, noon, at N. 60°, E. 2°, and on the 7th, noon, at the southern end of the Baltic, N. 54°, E. 15°. At this time there was a series of five depressions and cyclonic whirls extending from the Baltic to the coast of British Columbia.

E. 7th, noon, N. 58°, W. 20°; 8th, noon, N. 60°, W. 10°; 9th, noon, N. 60°, W. 10°; 10th, noon, N. 60°, W. 10°; 11th, noon, N. 59°, W. 8°; 12th, noon, N. 63°, E. 4°; here this special whirl and depression seems to have broken up on the coast of Norway while, at the same time, on its immediate western side a new one (F) developed over Scotland.

F. 13th, N. 60°, W. 2°; 14th, N. 64°, E. 6°; 15th, N. 70°, E. 20°. Simultaneously with the development of F the general barometric depression extended rapidly southward into the Mediterranean, and on the 14th, 15th, 16th, and 17th, a minor depression passed from Corsica eastward to the Baltic.

G. This was a continuation of low area No. VII, U. S. series, which was in British Columbia on the 7th and at the mouth of the St. Lawrence on the 12th, where it probably broke up and a new area formed at the southern extremity, whose center, on the 13th, noon, was at N. 42°, W. 62°; 14th, about N. 46°, W. 55°, after which this center was broken up and merged into the following one.

H. A continuation of U. S. series No. IX, and was central

in Minnesota on the 12th and in New England on the 14th; 15th, St. Johns, N. F., N. 48°, W. 56°; 16th, N. 50°, W. 40°; 17th, N. 56°, W. 30°; 18th, near Iceland; 19th, near North Cape.

I. This was a continuation of U. S. series No. XII, which was central in the Dakotas on the 14th, and, on the 16th, was in Ontario, at about N. 48°, W. 75°; 17th, N. 48°, W. 49°; 18th, N. 52°, W. 37°; 19th, N. 55°, W. 30°; 20th, N. 58°, W. 25°; 21st, near Iceland; 22d, near North Cape; 23d, beyond North Cape and apparently turning southeastward. On the 17th, at 10.25 p. m., the steamer *La Campine* was near the center of this storm, having pressure 29.40, wind northwest, force 11.

J. A continuation of U. S. series No. XIII, which was central in British Columbia on the 15th and in the valley of the St. Lawrence on the 19th; 20th, noon, N. 48°, W. 50°; 21st, N. 49°, W. 37°; 22d, noon, N. 53°, W. 26°; after which it appears to have broken up, and an extensive area of high pressure developed over Europe and the adjacent portion of the Atlantic. The following vessels passed near the center of this storm: *La Campine*, at N. 43°, W. 46°, 21st, 2.30 a. m., barometer 28.90, wind north, force 11; *Stockholm City*, N. 47°, W. 38°, 21st, noon, barometer 28.95, wind north-northwest, force 11; *Doubledam*, N. 46°, W. 37°, 21st, 1 p. m., barometer 29.03, wind west-southwest, force 11; *Massasoit*, N. 48°, W. 32°, 21st, 7.30 a. m., barometer 29.22, wind west, force 11.

K. This was a continuation of U. S. series No. XVI, and represents that branch that seems to have developed over New England and the adjacent coast on the night of the 21st-22d; it was central on the 22d at N. 44°, W. 60°; 23d, N. 46°, W. 39°; 24th, N. 49°, W. 39°; 25th, N. 51°, W. 35°; 26th, N. 54°, W. 31°, after which it moved northward beyond our reports and probably was overtaken by and united with the following storm. The following vessels passed near the center of this storm: *Sorrento*, N. 43°, W. 57°, 22d, 11.30 p. m., barometer 28.65, wind northwest, force 12; *Ocampo*, N. 40°, W. 56°, 22d, 4 p. m., barometer 29.27, wind northwest, force 11; *Hestia*, N. 44°, W. 39°, 23d, 6 a. m., barometer 28.36, wind west, force 12; *America*, N. 46°, W. 40°, 23d, 2.20 p. m., barometer 28.26, wind south-southeast, force 11; *Carthaginian*, N. 45°, W. 41°, 23d, 11 a. m., barometer 28.17, wind northwest, force 11; *Stockholm City*, N. 45°, W. 43°, 23d, 10 a. m., barometer 28.23, wind northwest, force 12; *Bengore Head*, N. 47°, W. 42°, 23d, noon, 28.34, wind northwest, force 12; *British Empire*, N. 46°, W. 40°, 23d, 1 p. m., barometer 28.44, wind north-northwest, force 11; *Temple More*, N. 49°, W. 32°, 25th, noon, barometer 28.65, wind southwest, force 9; N. 48°, W. 33°, 26th, 8 p. m., barometer 28.83, wind west-northwest, force 12. This storm was one of exceptional severity.

L. This was a continuation of No. XVIII of U. S. series, which was central over Lake Superior on the morning of the 24th, and in the St. Lawrence Valley on the morning of the 25th, while a minor depression, No. XIX, was central off the south Atlantic coast; the latter seems to have developed more rapidly than the former, and on the 26th, noon, a narrow trough stretched from Newfoundland southwest; 27th, N. 50°, W. 54°; 28th, both areas K and L had pushed north of our reports, and the extensive area of high pressure, U. S. series No. XVII, that had been moving southeastward over the North American continent since the 23d, now extended eastward over the Atlantic from Nova Scotia southward to the West Indies.

M. This was a continuation of U. S. series No. XX, which developed on the 28th and 29th off the coast of the middle Atlantic States and grew rapidly; it was central on the 30th at N. 46°, W. 58°; 31st, approximately, N. 52°, W. 36°. Among the vessels near the center of this storm were: *Temple More*, N. 42°, W. 55°, 30th, 8 a. m., barometer 29.00, wind north-northwest, force 12; *Schiedam*, N. 44°, W. 43°, 30th,

11.15 p. m., barometer 29.19, wind west-northwest, force 12; *Stockholm City*, N. 44°, W. 58°, 30th, 3 a. m., barometer 29.15, wind west-northwest, force 9.

WATERSPOUTS AT SEA.

Three waterspouts were observed off Cape Hatteras, N. C., in the afternoon of March 10, by Capt. Caull of the steamship *Castilian Prince*.

REMARKABLE OCEAN WAVES.

The remarkable heavy seas met with by steamers between America and Europe merit a special study. In certain circumscribed regions the interference and combination of different sets of waves giving rise to the great destructive wave may have some definite relation to the trend of the shore line, the location of the storm track, the general tide wave, and the depth of the ocean, such as will be elucidated by the collection and comparison of the observed phenomena.

The steamer *Teutonic* met a gigantic wave that swept over the vessel on Monday, March 26, while steaming westward.

OCEAN FOG FOR MARCH, 1894.

The limits of fog belts west of the fortieth meridian, as reported by shipmasters, are shown on Chart I by dotted shading. East of the fifty-fifth meridian fog was reported on 15 dates; between the fifty-fifth and sixty-fifth meridians on 8 dates; and west of the sixty-fifth meridian on 14 dates. Compared with the corresponding month of the last six years, the dates of occurrence of fog east of the fifty-fifth meridian numbered 10 more than the average; between the fifty-fifth and sixty-fifth meridians, about the average; and west of the sixty-fifth meridian, 9 more than the average.

OCEAN ICE IN MARCH, 1894.

The following table shows the southern and eastern limits of the region within which icebergs or field ice were reported for March during the last 13 years:

Southern limit.			Eastern limit.		
Month.	Lat. N.	Long. W.	Month.	Lat. N.	Long. W.
March, 1882	42 20	50 00	March, 1882	46 30	46 00
March, 1883	41 46	49 48	March, 1883	48 40	43 03
March, 1884	41 20	54 06	March, 1884	45 00	40 15
March, 1885	40 55	49 04	March, 1885	45 57	43 15
March, 1886	40 20	49 02	March, 1886	47 20	44 40
March, 1887	41 00	49 07	March, 1887	45 31	42 56
March, 1888	42 30	50 37	March, 1888	47 23	46 56
March, 1889	44 20	53 00	March, 1889	44 20	53 00
March, 1890	41 01	50 54	March, 1890	46 40	39 50
March, 1891	42 25	50 30	March, 1891	49 00	43 44
March, 1892	43 58	48 15	March, 1892	43 58	48 15
March, 1893	44 35	50 13	March, 1893	45 55	46 56
March, 1894	40 20	49 36	March, 1894	46 25	42 30
Mean	42 05	50 07	Mean	46 23	44 43

The limits of the region within which icebergs or field ice were reported for March, 1894, are shown on Chart I by crosses. The southernmost ice reported, an iceberg and a field of ice noted on the 25th, was about 2° south of the average southern limit, and the easternmost ice observed, two large icebergs and many detached pieces of ice in a radius of four miles, noted on the 2d in the position given in the table, was about 24° east of the average eastern limit of ice for March.

An unusual amount of ice for March was reported during the current month. On the 14th, in N. 42° 20', W. 51° 33', a berg 90 feet high and 1,000 long was observed; also, on the 20th, N. 44° 18', W. 48° 42', a berg 100 feet high and 1,000 feet long was noted. Field ice was encountered near the eastern and southeastern edges of the Grand Banks of Newfoundland on the 12th, 13th, 20th, and 24th. Field ice was noted near Cape Breton Island and eastern Nova Scotia on

the 19th and 24th. The British steamship *State of Georgia* met field ice on the 13th in N. 48° 22', W. 48° 48', but did not clear it for five days, her progress being greatly impeded,

and the plates of the vessel damaged. On the 17th the British bark *Armenia* collided with an iceberg in N. 44°, W. 48°; no report of the damage.

TEMPERATURE OF THE AIR.

[In degrees Fahrenheit.]

The distribution of the monthly mean temperature of the air over the United States and Canada is shown by the dotted isotherms on Chart II; the lines are drawn over the high irregular surface of the Rocky Mountain plateau, although the temperatures have not been reduced to sea level, and the isotherms, therefore, relate to the average surface of the country occupied by our observers; such isotherms are controlled largely by the local topography, and should be drawn and studied in connection with a contour map.

NORMAL TEMPERATURE.

In Table II, for voluntary observers, the mean temperature is given for each station, but in Table I, for the regular stations of the Weather Bureau, both the mean temperatures and the departures from the normal are given for the current month. In the latter table the stations are grouped by geographical districts, for each of which is given the average temperature and departure from the normal; the normal for any district or station may be found by adding the departures to the current average when the latter is below the normal and by subtracting when it is above.

DEPARTURES FROM NORMAL TEMPERATURE.

As compared with the normal for this month temperatures were in excess over the entire country east of the Rocky Mountains, but were deficient over the Rocky Mountain and Pacific coast region; the line of no departure extends from central Assiniboia southward through the eastern boundary of Wyoming and central Colorado to the southeastern portion of New Mexico. The maximum excess was from 10 to 12 over Lake Huron and the northern portion of Lake Michigan. The maximum deficits were: Helena, Mont., 3.2; Calgary, Alberta, 3.0; Edmonton, Alberta, 6.6; San Diego, Cal., 4.4; and Portland, Oreg., 4.5, with a rather smaller deficit at intermediate places.

The following table shows for certain stations, as reported by voluntary observers, (1) the normal temperature for March for a series of years; (2) the length of record during which the observations have been taken, and from which the normal has been computed; (3) the mean temperature for March, 1894; (4) the departure of the current month from the normal; (5) the extreme monthly means for March and the years of their occurrence during the period of observation:

State and station.	(1) Normal for the month of Mar.	(2) Length of record.	(3) Mean for Mar., 1894.	(4) Departure from normal.	(5) Extreme monthly means for March.			
					Highest.	Year.	Lowest.	Year.
<i>Arizona.</i>	°	Years	°	°	°		°	
Fort Apache	46.0	22	43.3	- 2.7	53.5	1879	41.3	1875
Fort Mohave	53.6	23	.....	.....	70.5	1879	58.0	1880
Whipple Barracks	43.4	22	41.9	- 3.5	53.8	1879	38.7	1886
<i>Arkansas.</i>								
Keesee Ferry	47.7	12	52.8	+ 5.1	55.4	1882	45.0	1891
<i>California.</i>								
Riverside	56.2	12	54.2	- 2.0	61.6	1885	51.5	1893
<i>Colorado.</i>								
Las Animas	40.0	12	42.9	+ 2.9	45.4	1887	33.2	1891
<i>Florida.</i>								
Merritts Island	66.0	12	69.7	+ 3.7	71.4	1882	61.6	1889
<i>Georgia.</i>								
Forsyth	56.7	20	62.8	+ 6.1	62.8	1894	51.4	1885
<i>Idaho.</i>								
Boise Barracks	43.0	20	41.0	- 2.0	49.1	1889	36.8	1882
Fort Sherman	38.2	10	35.0	- 3.2	43.6	1889	33.2	1882

Departures from normal temperature—Continued.

State and station.	(1) Normal for the month of Mar.	(2) Length of record.	(3) Mean for Mar., 1894.	(4) Departure from normal.	(5) Extreme monthly means for March.			
					Highest.	Year.	Lowest.	Year.
<i>Indiana.</i>	°	Years	°	°	°		°	
Lafayette	36.0	14	45.3	+ 9.3	45.3	1894	29.6	1885
<i>Iowa.</i>								
Cresco	25.2	22	35.7	+ 10.5	42.3	1878	19.6	1888
<i>Kansas.</i>								
Eureka Ranch	40.1	11	43.7	+ 3.6	46.0	1889	34.1	1891
Independence	44.5	22	50.6	+ 6.1	54.1	1878	36.7	1876
<i>Louisiana.</i>								
Grand Coteau	61.0	11	64.4	+ 3.4	66.2	1884	57.6	1892
<i>Maine.</i>								
Orono	27.5	23	32.5	+ 5.0	34.6	1871	19.1	1885
<i>Maryland.</i>								
Cumberland	37.1	23	44.9	+ 7.8	46.0	1878	30.0	1875
<i>Michigan.</i>								
Kalamazoo	31.3	18	41.3	+ 10.0	42.2	1878	22.5	1885
<i>Missouri.</i>								
Sedalia	41.3	11	48.8	+ 7.5	48.8	1894	36.1	1891
<i>Montana.</i>								
Fort Custer	32.5	12	28.4	- 4.1	40.8	1889	23.0	1888
<i>Nebraska.</i>								
Fort Robinson	34.0	10	36.9	+ 2.9	43.0	1889	24.8	1891
Genoa (near)	32.1	18	40.5	+ 8.4	43.6	1878	23.8	1876
<i>Nevada.</i>								
Brown	46.7	22	.....	.....	52.8	1879	37.7	1880
Carson City	41.3	17	40.8	- 0.5	50.1	1877	33.5	1880
<i>New Hampshire.</i>								
Hanover	27.8	23	35.9	+ 8.1	35.9	1894	19.0	1872, 1875
<i>New Mexico.</i>								
Fort Wingate	41.9	23	39.0	- 2.9	51.1	1879	34.3	1886
<i>New York.</i>								
Cooperstown	27.4	23	35.5	+ 8.1	37.2	1871	18.3	1885
Plattsburg Barracks	26.6	23	34.2	+ 7.6	35.0	1871	16.7	1885
<i>North Carolina.</i>								
Lenoir	45.5	20	52.0	+ 6.5	52.0	1894	35.0	1877
<i>Oklahoma.</i>								
Fort Reno	48.3	10	49.6	+ 1.3	52.8	1887	45.5	1891
Fort Sill	51.0	22	53.9	+ 2.9	59.3	1879	42.0	1876
Fort Supply	44.9	15	47.4	+ 2.5	52.6	1882	37.4	1876
<i>Oregon.</i>								
Bandon	46.8	10	45.5	- 1.3	50.8	1889	41.5	1886
<i>Pennsylvania.</i>								
Dyberry	28.6	23	37.7	+ 9.1	37.7	1894	19.5	1885
Grampian	30.5	23	39.8	+ 9.3	40.4	1878	20.1	1885
Wellabore	30.5	14	39.4	+ 8.9	39.4	1894	22.4	1885
<i>South Carolina.</i>								
Statesburg	52.7	13	60.4	+ 7.7	60.4	1894	48.3	1885
<i>South Dakota.</i>								
Fort Sully	29.1	23	34.8	+ 5.7	44.5	1878	15.9	1876
<i>Texas.</i>								
Austin	60.4	22	.....	.....	66.8	1879	53.0	1872
Silver Falls	51.7	8	53.3	+ 1.6	57.6	1887	47.7	1891
<i>Utah.</i>								
Terrace	42.0	22	41.9	- 0.1	51.3	1889	28.3	1875
<i>Vermont.</i>								
Stratford	26.0	21	33.3	+ 7.3	33.8	1878	17.2	1883
<i>Virginia.</i>								
Dale Enterprise	41.5	14	47.2	+ 5.7	47.2	1894	32.1	1885
<i>Washington.</i>								
Fort Townsend	44.5	21	41.4	- 3.1	50.7	1885	38.7	1880
<i>West Virginia.</i>								
Parkersburg	41.7	12	47.3	+ 5.6	52.8	1882	36.7	1890
<i>Wisconsin.</i>								
Madison	29.3	23	38.3	+ 9.0	43.9	1878	23.2	1888
<i>Wyoming.</i>								
Fort Washakie	33.1	11	31.5	- 1.6	41.0	1887	26.8	1891

MONTHLY MEAN TEMPERATURE.

For the regular stations of the Weather Bureau the monthly mean temperature is the simple mean of all the daily maxima and minima; for voluntary stations a variety of methods of computation is necessarily allowed, as shown by the notes appended to Table II.

During March, 1894, the mean temperature was highest at Key West, Fla., 73.9, but lowest among United States stations at St. Vincent, Minn., 21.7, and among Canadian stations reporting by telegraph, 10.1, at Battleford, Saskatchewan. The temperature averaged 32 in a zone passing through central

Maine, northern Vermont, northern Lake Huron, northern Michigan, north-central Wisconsin, south-central Minnesota, central South Dakota, central Wyoming, western Montana, and the eastern portion of British Columbia.

YEARS OF HIGHEST MEAN TEMPERATURE FOR MARCH.

The mean temperature for March, 1894, was the highest on record at regular Weather Bureau stations, as shown in the following table, which also gives the highest previous record:

Highest mean temperature for March.

Stations.	Mar., 1894.	Departure from normal.	Highest previous.	
			Temperature.	Year.
Eastport, Me.	33.4	+4.8	33.4	1881
Northfield, Vt.	34.0	+8.7	29.5	1889
Boston, Mass.	42.5	+7.9	41.5	1871
Nantucket, Mass.	39.3	+4.9	36.4	1889
Vineyard Haven, Mass.	43.0	+6.8	38.6	1889
Narragansett Pier, R. I.	39.4	+6.1	36.8	1889
Block Island, R. I.	39.8	+4.8	37.9	1882
Albany, N. Y.	39.8	+6.8	38.8	1882
New York, N. Y.	45.4	+7.3	43.8	1878
Cape May, N. J.	44.0	+6.2	43.6	1878
Cape Hatteras, N. C.	55.6	+5.9	53.3	1884
Raleigh, N. C.	56.0	+7.7	49.6	1890
Charlotte, N. C.	56.6	+5.8	54.6	1879
Chattanooga, Tenn.	55.6	+4.6	55.1	1882
Columbus, Ohio.	46.2	+7.4	44.2	1882
Pittsburg, Pa.	47.4	+8.1	47.3	1871
Springfield, Ill.	46.6	+6.7	44.3	1889
Topeka, Kans.	48.6	+9.4	44.9	1889
Columbia, Mo.	45.8	+6.3	44.1	1889
Des Moines, Iowa.	42.6	+7.6	42.2	1889
Green Bay, Wis.	37.0	+11.5	34.0	1889

YEARS OF LOWEST MEAN TEMPERATURE FOR FEBRUARY.

The mean temperature for March, 1894, was the lowest on record at the following regular Weather Bureau stations: Tatoosh Island, Wash., 42.1, or 3.1 below the normal, the lowest previous being 41.0 in 1890; Fort Canby, Wash., 42.6, or 2.8 below the normal, the lowest previous being 43.8 in 1891; Astoria, Oreg., 43.5, or 3.1 below the normal, the lowest previous being 44.0 in 1886.

MAXIMUM TEMPERATURE.

The maximum temperatures at regular stations of the Weather Bureau are given in Table I, from which it appears that the highest maxima were: Abilene, Tex., 92; Yuma, Ariz., 95; Raleigh, N. C., 89; Norfolk, Va., Augusta and Savannah, Ga., and Titusville, Fla., 88. The lowest maxima were: St. Vincent, Minn., 48; Duluth, Minn., and Eastport, Me., 51.

The maximum temperatures for Arkansas, Missouri, Iowa, and South Dakota and thence eastward to the Atlantic Ocean occurred in general from the 17th to the 22d, and were the highest on record for the past twenty years. In connection with this unusually warm period a special bulletin was issued on March 23d, as follows:

The weather reports show that throughout the middle and south Atlantic States, from eastern Pennsylvania and New Jersey to South Carolina, and in northern Georgia and Alabama and eastern Tennessee, Thursday, March 22, was the warmest day, so far as the Weather Bureau has record, that has ever occurred during the month of March.

Throughout Maryland, Virginia, and North Carolina the temperatures on Monday, March 19, also rose higher than during any previous March.

The records throughout the eastern portion of the United States indicate generally that the present month has been an unusually warm one.

At Washington, D. C., up to and including March 22, there has been an excess of temperature over the normal for the month of 268°, or an average of over 12° a day. Last year at the same date there was a deficiency of 10° for the month, or an average of about one-half a degree a day.

MINIMUM TEMPERATURE.

The lowest temperatures recorded at regular stations of the Weather Bureau are given in Table I, from which it appears that the lowest minima were: Havre, Mont., -17;

St. Vincent, Minn., -12; Moorhead, Minn., -11; Bismarck, N. Dak., -10. The highest minima were: Key West, Fla., 61; Jupiter, Fla., 45; Tampa, Fla., 39; Galveston and Corpus Christi, Tex., and Titusville, Fla., 38.

DAILY AND MONTHLY RANGES OF TEMPERATURE.

The greatest daily range of temperature is given for each of the regular Weather Bureau stations in Table I, from which the following are selected:

Greatest daily ranges.—Pueblo, Colo., 51; North Platte, Nebr., 50; Denver, Colo., and Havre, Mont., 49; Rapid City, S. Dak., and Valentine, Nebr., 48; Columbia, Mo., and Huron, S. Dak., 47; Colorado Springs, Colo., 46; Dodge City, Kans., 45.

Smallest daily ranges.—Key West, Fla., and Tatoosh Island, Wash., 13; Nantucket, Mass., 16; Woods Holl, Mass., 17; Block Island, R. I., 19; Fort Canby, Wash., 18; Point Reyes Light, Cal., 18.

Monthly ranges.—The extreme monthly ranges, as computed for each Weather Bureau station from the data given in Table I, show that monthly ranges of 70°, or more, occurred in Kansas, Missouri, Nebraska, Iowa, Minnesota, North Dakota, South Dakota, and Montana.

Largest monthly ranges.—Huron, S. Dak., 85; Sioux City, Iowa, 82; Valentine, Nebr., 81; Omaha, Nebr., 80; Havre, Mont., and Columbia, Mo., 79; St. Paul, Minn., 78.

Smallest monthly ranges.—Tatoosh Island, Wash., 21; Key West, Fla., 22; Port Angeles, Wash., 25; San Francisco, Cal., and Neah Bay, Wash., 29.

DIURNAL PERIODICITY.

The regular diurnal period in temperature is shown by the hourly means given in Table V for all stations having self-registers.

LIMITS OF FREEZING TEMPERATURE.

The southern limit of the region within which the air has had a freezing temperature at some time during the month is approximately shown by the full and dotted lines on Chart V, joining the places at which the minimum temperatures of 32 and 40, respectively, occurred within the instrument shelters of the Weather Bureau; the latter minimum is usually accompanied by a more or less severe frost on the ground outside of shelter. During March, 1894, the line of minimum 40 crossed the peninsula of Florida just south of Titusville and Tampa, and does not reappear in Texas or California. The line of minimum 32 passes from Charleston, S. C., to Jacksonville, Fla., thence westward through New Orleans, La., into southwestern Texas; it reappears east of Yuma, Ariz., traverses the central part of California and the coast line from San Francisco, Cal., to Vancouver Island.

ACCUMULATED TEMPERATURES.

From January 1 to the end of the current month the average temperature for each geographical district was above or below the normal by amounts that are given by adding together the departures, as given in Table I in heavy faced type for the respective months. The average departure is then found by dividing these sums by the proper number of months. If this average departure were added to the normal temperature and multiplied by the number of days, it would give the accumulated temperature, as that term is used by phenologists. If, however, we confine our attention to the average departures from normal values, we obtain an equally plausible basis for the comparison of temperatures and crops.

In regions where the accumulated temperature has been deficient, the average deficit for the period was as follows: Northern slope, 1.0; southern slope (Abilene, Tex.), 0.3; southern plateau, 3.3; middle plateau, 1.6; north Pacific coast, 1.3; middle Pacific coast, 2.7; southern Pacific coast, 3.1.

In regions where the accumulated temperature was in excess, the average excess for the period was as follows: New England, 1.8; middle Atlantic coast, 3.0; south Atlantic coast, 2.5; Key West, Fla., 0.8; east Gulf States, 1.3; west Gulf States, 0.7; Ohio Valley and Tennessee, 3.0; lower Lake region, 4.0; upper Lake region, 4.6; North Dakota, 2.3; upper Mississippi Valley, 3.3; Missouri Valley, 2.3; middle slope, 0.2; and northern plateau, 0.5.

PERIODS OF HIGH TEMPERATURE.

The maximum temperatures of the month occurred on dates and at stations that may be grouped as follows: On the 12th, in Colorado, extending thence southeastward, on the 13th and 14th, into Texas; on the 16th, in eastern Montana, North Dakota, South Dakota, and Nebraska, extending eastward on the 17th over southern Minnesota, Wisconsin, Iowa, Kansas, and northern Illinois; on the 18th, further eastward over lakes Michigan, Huron, Erie, and Ontario; and, finally, on the 19th, over northern New England. On the 20th and 21st, while low area No. XIV was moving from Kansas north-eastward into the Lake region, the highest maxima of the month occurred in eastern Missouri, southern Illinois, Indiana, Ohio, eastern Arkansas, western Tennessee, Kentucky, and West Virginia, and on the 22d, when this area was central in the Lake region, the principal maximum temperatures of the month occurred throughout the middle and south Atlantic States.

PERIODS OF LOW TEMPERATURE.

The lowest temperatures of the month occurred at the highest stations in the early part of the month, but for all lower stations east of the Rocky Mountains they occurred in connection with the great cold wave of the 25-28th. Thus, on the 25th, the lowest minima of the month occurred in Minnesota, South Dakota, Nebraska, western Kansas, northern Missouri, and Iowa; on the 26th the monthly extremes occurred in northern Texas, southern Missouri, Arkansas, western Louisiana, the coast of Texas, Indiana, and Michigan; on the 27th the lowest temperatures of the month occurred throughout Florida, the east Gulf, south Atlantic, middle Atlantic, and New England States.

In connection with this sudden change from warm to cold weather, Chart No. VII of this REVIEW was prepared by Mr. James Berry, in charge of the Division of State Weather Services, and shows the departures from the normal of the average temperature for the seven days, from March 25 to 31.

In connection with this cold period a special bulletin was issued on March 26, from which the following extract is taken:

The period of extremely warm weather, noted in the special bulletin issued by the Weather Bureau on the 23d instant, has been followed on Sunday and this morning by one of extreme cold, which extends over almost the entire country east of the Rocky Mountains, minimum temperatures of freezing and below being reported this morning over all this region, except on the immediate coast of the south Atlantic and Gulf States and in Florida. Throughout northern Minnesota and the Dakotas the temperature this morning was below zero. In northern Georgia, eastern Tennessee, Louisiana, Texas, Arkansas, and southern Missouri, the weather is the coldest of which the Service has record for this season of the year.

Following are some minimum temperatures reported this morning from this region, with the number of degrees below the lowest previously recorded during the third decade of any March, viz: Palestine, Tex., 28, 3; Corpus Christi, Tex., 38, 4; Fort Smith, Ark., 20, 8; Little Rock, Ark., 24, 3; San Antonio, Tex., 32, 3; Springfield, Mo., 12, 1. The following temperatures are as low as any before recorded during this period, viz: Montgomery, Ala., 26; New Orleans, La., 36; Galveston, Tex., 38; Atlanta, Ga., and Chattanooga, Tenn., 20.

General frosts occurred Monday morning throughout the Gulf States and the middle and northern portions of the south Atlantic States, and the temperature will probably fall still lower on Tuesday morning in the middle and south Atlantic States, with frosts as far south as northern Florida.

AREAS OF 20° FALL IN TWENTY-FOUR HOURS.

A fall of 20°, or more, in temperature in twenty-four hours is not called a cold wave by the Weather Bureau unless the temperature falls below 40°, and is, therefore, likely to cause a frost

injurious to vegetation, but all falls of 20° are indicated on the Daily Weather Map by inclosing the areas within which they occur by heavy dotted lines, and the following list enumerates these regions for the month of March. An approximate idea of the size of the area covered is given by stating in miles the lengths of the two principal dimensions when these can be given; one of these is necessarily omitted when the area extends beyond the region covered by the Weather Maps.

(A) 1st, a. m., 200 by 200 miles in Saskatchewan.

(B) 2d, a. m., 200 by 300 miles in Alberta; p. m., 600 by 800 miles in Saskatchewan. 3d, a. m., 800 by 300 miles in Montana, Assiniboia, and Saskatchewan; p. m., 500 by 250 miles in North Dakota and South Dakota.

(C) 4th, p. m., 100 by 500 miles in New Mexico, and 400 by 500 miles in North Dakota and South Dakota. 5th, a. m., 900 by 200 miles, northern Texas, Kansas, Nebraska, and southern Minnesota; p. m., 200 by 700 miles, Kansas to Minnesota. 6th, a. m., 1,500 by 200 miles, eastern Kansas, eastern Iowa, Wisconsin, northern Minnesota, and Manitoba; p. m., 150 by 250 miles, lakes Ontario and Erie. 7th, a. m., 1,000 by 200 miles, Tennessee, Kentucky, Indiana, Ohio, and Lake Huron; p. m., 200 by 200 miles, western New York.

(D) 10th, a. m., 900 by 200 miles, northern Nevada, southern Idaho, Wyoming, and northern Utah; p. m., 700 by 200 miles, northern Colorado, Nebraska, and western Iowa. 11th, a. m., 600 by 200 miles, eastern Colorado, Kansas, and Missouri.

(E) 12th, a. m., 200 by 100 miles, West Virginia.

(F) 14th, a. m., 400 by 400 miles, north of lakes Superior and Huron.

(G) 17th, a. m., 400 by 200 miles, northern Nevada and Utah; p. m., 400 by 200 miles, western part of North Dakota and South Dakota. 18th, p. m., 400 by 200 miles, New Mexico, and 800 by 300 miles, Kansas, Iowa, and Wisconsin. 19th, a. m., 300 by 300 miles, Wisconsin and Michigan; p. m., 100 by 100 miles, Lake Michigan, and 600 by 200 miles, New York, lakes Erie, Ontario, and Huron. 20th, a. m., 300 by 200 miles, northern New York.

(H) 20th, a. m., 200 by 200 miles, Alberta; p. m., 500 by 200 miles, Wyoming, Colorado, and New Mexico. 21st, a. m., 600 by 150 miles, South Dakota, Nebraska, and Colorado, and 100 by 100 miles, Manitoba; p. m., 700 by 250 miles, Nebraska, Kansas, and northern Texas. 22d, a. m., 700 by 250 miles, Iowa, Missouri, Kansas, and Indian Territory; p. m., 1,200 by 400 miles, Lake Ontario, Indiana, Illinois, Iowa, Missouri, Arkansas, Louisiana, and eastern Texas. 23d, a. m., 700 by 200 miles, Indiana, Kentucky, Tennessee, and northern Mississippi; p. m., eastern Tennessee, Virginia, western Maryland, and Pennsylvania. 24th, a. m., 600 by 200 miles, northern Georgia, South Carolina, North Carolina, and Virginia.

(I) 23d, p. m., 500 by — miles, Montana, Assiniboia, Saskatchewan, and Alberta. 24th, a. m., 700 by 700 miles, Montana, North Dakota, Manitoba, and Assiniboia; p. m., 1,200 by 500 miles, Colorado, Kansas, Iowa, Nebraska, Minnesota, South Dakota, North Dakota, and Manitoba. 25th, a. m., 800 by 300 miles, Missouri, Illinois, and lakes Michigan and Superior; p. m., 900 by 250 miles, Arkansas, Tennessee, Kentucky, southern Indiana, Ohio, West Virginia, western Pennsylvania, and western New York. 26th, a. m., 500 by 500 miles, Alabama, Georgia, northern Florida, South Carolina, western North Carolina, and western Virginia; p. m., 100 by 100 miles in southern Florida. In connection with the cold weather of the 26th, see the section on "Temperature as affecting agriculture."

(J) 27th, p. m., 200 by 500 miles, western Montana and Alberta. 28th, a. m., 800 by 250 miles, western Montana and Wyoming; p. m., 900 by 400 miles, Colorado, Nebraska, Kansas, New Mexico, and western Texas. 29th, a. m., 400 by 300 miles, New Mexico and Texas, and 300 by 100 miles, Missouri.

(K) 30th, p. m., 300 by 100 miles, Assiniboia.

FROSTS.

The frosts that occurred in March partook of the nature of cold waves and freezing temperatures, and will be mentioned in the section on "Temperature as affecting agriculture."

COLD WAVES.

A general account of areas of 20° fall of temperature has already been given, and additional notes will be found under sections on "High areas" and "Local storms."

TEMPERATURE AS AFFECTING AGRICULTURE.

The following records of cold and warm periods are taken from newspaper summaries and the official reports of the State Weather Services:

Arkansas.—The month was abnormally warm up to the 22d, when the temperature began to decline, reaching its minimum on the 25th, 26th, and 27th in the various parts of the State. The high temperature during the first twenty days of the month had been highly favorable for the rapid growth of vegetation; gardens were well advanced, and peach and plum trees in full bloom; wheat and oats had started growing nicely; much corn had been planted, and some of it was up. On the 25th the temperature dropped suddenly, and freezing temperatures were reported generally during the four succeeding nights; ice formed to a thickness of two or three inches on water exposed in tubs and barrels. In consequence, about all the peaches and plums were killed, gardens ruined, wheat and oats damaged, and much corn so injured as to necessitate replanting. The late apples were not materially injured, and a light crop of pears will be gathered. Strawberries were set back from two to three weeks. This very cold weather, following so closely upon the excessive precipitation of the middle of the month, placed farmers very much behind with their work.

Arizona.—At Globe, 21st, apricot crop destroyed and peach crop injured to some extent. Signal, 5th, and St. Helena Ranch, 18th, 19th, and 20th, about 60 per cent of the apricot buds killed; no other fruit injured. Eagle Pass, 6th and 18th, apricots and almonds killed on the Gila.

California.—Lemoore, 21st, heavy frost, injuring fruit. Niles: heavy frost, killing potatoes, almonds, and apricots.

Delaware.—Milford, 26-29th, cold wave damaged peaches.

District of Columbia.—Washington: fruit buds and magnolia flowers killed by heavy frost.

Florida.—27th-31st, some damage to crops and fruits in the western and northern counties was done by the frosts and freezing weather.

Georgia.—27-29th, Adairsville, Athens, Brag, Camilla, Cohutta, Covington, Fleming, Hawkinsville, Leverett, Marshallville, Morgan, Rome, Point Peter, Pelham, Fort Valley, Thomasville, Clifton, and Griffin: frost killed fruit, vegetables, and wheat. Augusta: minimum temperature of the 27th was 25°, or the lowest of this winter; on the 28th another heavy frost, all tender vegetation and fruit were killed. Savannah: estimated damage in immediate vicinity, \$100,000, but the warnings issued by the Weather Bureau were the means of saving at least \$20,000; many of the gardeners began covering their crops on Friday, 23d, while the cold wave was still in the distant northwest. A rice planter, thanking the observer for forecasting the frost, said: "I saved my rice by opening my dams and flooding my fields with water." The previous severe frost in March, at Savannah, was March 16, 1890, minimum temperature, 26°.

Illinois.—The cold wave of the 26th generally killed peaches, plums, pears, cherries, strawberries, and garden vegetables; in southern Illinois grapes and melons suffered slightly less.

Indiana.—Exceedingly fine, warm weather until the 22d, and occasional rains; vegetation advanced most remarkably; wheat in all sections was rank, and in the southern portion it began to joint in some fields; fruit buds were almost ready to open, and in the southern and central portions oats and clover sown early had come up, when, after the 23d, the temperature fell suddenly to below freezing several nights, and much injury was done to some crops. Wheat apparently was hurt in many fields, but most so in the southern portion, where it had jointed; clover and oats in the central and southern portions were frozen, but in the northern portion, where they had not advanced so much and were covered by snow, the injury is probably less; early planted potatoes froze in the ground and tobacco had to be replanted. There is no doubt that all early varieties of fruit were injured more or less; peaches had already been totally injured in January and February, but most cherries, pears, early apples, and some berries will yield probably a poor crop, or none at all; grapes and late apples are probably all sound. Most of the clover and oats have to be replanted, but wheat is turning to its natural color, with warmer and more favorable weather.

Iowa.—College Springs: first part of the month fine weather; farmers sowing grain, making gardens, and planting potatoes, but on the 26th the thermometer registered zero Fahr., which was not the best condition for oats one inch high; it is hard to tell how much will have to be replanted; do not think fruit buds were far enough advanced to be injured much by the frost. Ovid: first three weeks of March the warmest ever known here; soft maple in bloom on the 13th, elms on the 16th; oats nearly all sown before the 24th; potatoes planted and gardens made, but the freezing weather of the past week spoiled it all.

Kansas.—The warm temperature of the first part of the month, ending on the 23d, started the early blossoms of cherries, plums, and apricots, so that the cold temperature which followed seriously injured, if not entirely destroyed, them.

Kentucky.—March was phenomenal for the great heat during the first two decades; vegetation developed rapidly, only to be stunted and even killed by the severe cold wave which followed.

Louisiana.—25-30th, the freezing weather was most injurious in the northern portion of the State, and the damage decreased going southward until near the coast line, where only the most tender vegetation was affected. Fruit suffered most severely; corn, Irish potatoes, garden truck, and tender vegetation of all descriptions sustained marked injury, and were cut down in the northern parishes, partially so in the middle parishes, and less markedly further south. Considerable replanting will be done, and this work has probably commenced wherever necessary. None or but little cotton had been planted at the close of March, and there is, therefore, no setback as far as this staple is concerned. Cane sustained but little injury from the cold and will soon recover.

Maryland.—Charlotte Hall, 25-26th, cold weather injured fruit bulbs.

Massachusetts.—Taunton: the freeze of the 27-30th damaged the buds on trees.

Michigan.—During the warm weather that prevailed previous to the 25th of March fruit buds developed to some considerable extent, and grave fears were felt that the cold wave of that date would work great harm if not ruin to the crop. A large number of letters have been received from fruit specialists since April 1, but at the time they were written the growers themselves were not entirely satisfied as to the amount of damage. The Grand River Valley Horticultural Society, March 27, believed no harm had been done, but one of its members a few days later found pears and peaches badly injured. At Ionia the growers think their crop injured but a trifle. A St. Joseph correspondent thinks peaches are all killed. At South Haven a fair crop of all kinds of fruit is expected. In Washtenaw peach buds had started to bloom, in some cases showing color; all such on low grounds are killed, while those on higher ground are not injured; apples and other fruits on high lands have escaped. A fair conclusion from these letters is that the early and tender varieties of fruit, especially peaches and pears, have been injured, but the later and harder kinds are yet safe. This is particularly true of apples. There is no reason why a full crop of this fruit should not be expected.

Mississippi.—The close of March found farming operations about as well advanced as the average season. The cold spell of the 25-30th arriving at this critical period proved very disastrous; corn was cut to the ground and much replanting will be necessary. Fortunately very little cotton had been planted, for this was killed; spring oats were seriously retarded; peaches, pears, plums, pecans, grapes, and the first crop of strawberries are thought to be killed, even to the coast; apples and figs, though seriously affected, have survived. As an indication of the severity of the cold it is worthy of note that hickory nuts, acorns, and young fruit trees are thought to be killed in the northern portions of the State. Early vegetables, where unprotected, were completely destroyed, and the loss to truck growers was very considerable. Although the frost predictions of the Weather Bureau furnished ample warning of the approach of the cold, it was not practicable to protect the tender plants against the effects of the cold weather for such a protracted period. This sudden and severe cold spell has thrown farming operations some ten or fifteen days late.

Missouri.—From the opening of the month until the 22d the weather was unusually warm and favorable for farm work, and it was vigorously pushed; the greater portion of the oat crop was sown, gardens were made, potatoes planted, and considerable ground broken for corn; by the 22d many fields of oats were up, early gardens were making rapid growth, and the early varieties of fruit trees were nearly in bloom. The cold wave (26-30th) proved the most destructive that has visited this State for a number of years. In the southeast section the temperature fell 12° to 20° below freezing, and 20° to 30° below in other sections, the lowest temperature recorded being but 2° above zero. Oats and young clover were killed; wheat was seriously injured; garden plants that were up were killed; potatoes were frozen in the ground, and fruit was greatly injured, and in many sections all except the late varieties were entirely killed.

Nebraska.—March practically closed a very short and open winter in this State. The latter part of the month was windy and disagreeable, and fruits, especially peaches, suffered great injury from frosts and sudden freezes.

New England.—The cold wave (25-26th) caused comparatively little damage in New England. In the extreme north the ground is still covered with snow, and in the central districts the buds had made very little start. In the south no field or garden crops were advanced far enough to be injured, and although at first it was thought that much damage had been done to fruit, reports from well-known fruit growers show that the fears were groundless, and peaches only are injured, and those but slightly.

New York.—25-27th, the frosts are reported to have almost entirely destroyed the vineyard industry of the northern part of Chautauqua.

North Carolina.—The frosts of the 26-29th destroyed early vegetables, fruits, peaches, and berries, and injured corn, wheat, clover, and other grains at 18 stations from which reports have been received.

Ohio.—The cold weather of 26-28th is reported to have killed all early fruits and greatly injured wheat and oats, and the later fruits at numerous stations in this State.

Oklahoma and Indian Territory.—Lehigh: The warm weather during the first three weeks brought on vegetation at an unprecedented rate, fruit trees

all blossomed and many leaved out, grapes budded, early vegetables all up, and then the four days of hard freeze, 25th to 29th, utterly destroyed all new leaves and nearly all fruit buds, though at this date, April 1, some peaches seem to show life; strawberries checked in growth, but not killed; oats damaged some. Pond Creek: high winds, 2d, 10th, 17th, 24th, 27th, and 30th; wheat injured considerably thereby. Clifton: elm buds out on the 1st, and crocus in bloom. The first two-thirds of the month were very fine for farming, and much plowing and other work completed. From 24th to 29th, it was very cold with hard frosts, the blooms of the elm and early vegetation killed. Ponca City: peaches in bloom on the 25th; crops damaged by cold in this section. South McAlester: no storms and unusually warm during early part of the month, but uncommonly cold during the latter part of the month; not much damage done, as farmers were late in planting on account of hot weather; some fruit killed, but plenty left for a good crop. Anadarko: frosts of 26th and 27th killed all early fruit. Haldton: the frosts of 24th, 25th, and 26th, injured oats, wheat, and corn that were up, and all early vegetation.

Pennsylvania.—The extreme weather of the current month is paralleled by March, 1868, but exceeded by that of March, 1854, when the maximum temperature of 78° occurred, as compared with 76.5° on March 22, 1894. The latter was followed by the extraordinary fall of temperature to the minimum of the 27th, but the damage done to crops was not so severe as would have been the case had this fall been more rapid; however, peaches, apples, and strawberries are severely injured. In March, 1854, flowers and crops of every kind were ruined, the average temperature of the first 17 days was 50.5, and of the last 14 days, 33.8. The blizzard of March, 1888, attended a spell of cold weather, bringing the average temperature of the month down to 34.7.

South Carolina.—March opened under the most favorable conditions for farming operations. Abundant rains and snow in February had thoroughly saturated both the surface and subsoil; a few warm, dry days in the early part of the month dried the top of the softened ground making plowing easy and thorough. After the 5th the heat was steadily excessive up to the 23d, and during the latter part of this period the warmth was equal to that of the ordinary first half of June. Under the combined stimulus of heat and moisture the buds on fruit trees swelled and bloomed; forest trees put out their leaves; wild and cultivated berries advanced in growth with wonderful rapidity; grapes were three weeks in advance of their season; gardens were planted earlier than usual, and made exceedingly rapid growth; all grains made a thick, luxuriant stand; in short, gardens and fields, orchards and forests, flowers and grasses, shrubbery and fruit trees had the appearance usual in the middle of April. After the freeze and frosts of the 27-30th wheat and oats turned yellow, and that of the rankest growth fell to the ground; the leaves of fruit and forest trees turned black, withered, and shriveled; gardens and tender grasses all were as if scathed by fire; corn cut down level with the ground. Some late fruit may have escaped; berries have yet time to rebud where the vines and stalks are not killed; gardens and corn can be replanted; yet, making all allowances, the loss was enormous in the two items of fruit destroyed and the cost of seeds for replanting. It is thought that much ornamental shrubbery and many trees of all varieties, as well as grapevines, blackberries, and other bushes, etc., are killed. The full extent of the damage to grains can not be known until maturity and thrashing begins and the effect on the berry can be noted. The damage was not confined to part of the State but extended from the mountains to the coast. The northwestern portion was coldest, but vegetation was correspondingly backward.

The Director of the South Carolina State Weather Service has summarized the reports of damage done by the cold weather of March 26, 27, and 28, received by him from 106 stations fairly distributed over the 35 counties of that State, and from his tabular presentation of these reports the editor has prepared the following abstract:

Apricots and peaches; 89 reports. Totally destroyed, 84; partially, 5. Figs and pears; 87 reports. Totally destroyed, 80; partially, 7. Pomegranates and plums; 84 reports. Totally destroyed, 77; partially, 6. Apples; 81 reports. Totally destroyed, 51; partially, 27. Raspberries, strawberries, and blackberries; 77 reports. Totally destroyed, 66; partially, 11. Rye and wheat; 45 reports. Totally destroyed, 2; partially, 38. Oats; 53 reports. Totally destroyed, 1; partially, 46. Corn; 47 reports. Totally destroyed, 21; partially, 25. Melons, potatoes, cabbage, and garden truck; 92 reports. Totally destroyed, 84; partially, 8. Grapes; 89 reports. Totally destroyed, 89.

South Dakota.—The season opened unusually early. The first and second decades of March were unusually warm, and more or less plowing and seeding was done in all portions of the State. The last decade was stormy and very cold, stopping all field work until about the first of April. There was some loss of cattle, but, it appears, not near as great as was at first reported.

Tennessee.—Unusually high temperature prevailed during the first three weeks of the month, when the daily means averaged about 12° above the normal. As a natural consequence of this abnormally warm weather, general farm work advanced rapidly and vegetation was much in advance of the normal. This warm period was followed by the most severe cold wave of the month, which reduced the temperature to considerably below the freezing point. Up to the 23d of the month farmers were fully two weeks in advance of last season, and crops of all kinds were in excellent condition, except peaches, which were badly injured in some localities by the cold in January. The cold wave of the 26th and 27th killed fruit, vegetables, young clover, oats, tobacco plants in some localities, and seriously damaged wheat and Irish potatoes.

Utah.—Vegetation did not advance much in March, and the spring may fairly be called a backward one.

Virginia.—During the cold wave of the 26th to 28th the temperature was generally lower than ever previously recorded for the time of year, and following the protracted and unusual warm weather, caused very great damage to all growing crops and destroyed nearly all early fruit and tender vegetation.

West Virginia.—The following is a résumé of 100 reports from the 44 principal agricultural counties: Up to and including the 24th the conditions were markedly favorable to the growth of all forms of vegetation, and farming operations were pushed accordingly. This abnormal state of temperature was followed on the 25th by conditions decidedly the reverse. * * * A hard freeze on the morning of the 26th, a hoar frost on the 27th, and a killing frost on the 28th proved very destructive to all forms of vegetation, in many instances being almost fatal as far as a future crop was concerned. * * * Owing to the rather open winter wheat was not as well protected by snow as generally, but some is up and looking fairly well. Clover and grass had started nicely, but much damage was done by the freeze and frosts. Some wheat and oats were also frozen. In some localities the fall of snow that accompanied the freeze protected the wheat and oats to a very great extent. Garden truck was doing nicely until the 26th; early planted potatoes and onions were badly injured by the cold, and gardens generally will be affected; apples, pears, peaches, plums, cherries, quinces, and grapes were all injured; in some districts peaches, cherries, and early apples were killed outright. Plowing and preparing ground for corn is well along, but was retarded somewhat by the recent cold snap, owing to the fact that the ground was frozen.

Wisconsin.—The month of March was one of high temperatures for the first eighteen days, and of temperatures at or below the normal for the balance. Except in the northern counties the ground has been without snow covering during the month, and while winter grains were exposed to the severe frosts of the latter part of the month it is thought that no serious damage has resulted; clover, however, is probably injured in some counties.

PRECIPITATION.

[In inches and hundredths.]

The distribution of precipitation over the United States and Canada for March, 1894, as determined by reports from about 2,000 stations, is exhibited on Chart III. In Tables I, II, and III, the total precipitation is given for each station; the departures from the normal are given for regular stations of the Weather Bureau in Table I. The figures opposite the names of the geographical districts in the columns for precipitation and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the precipitation is below the normal and subtracting when above. The average departure for each State is given in the chapter of reports from the State Weather Services.

NORMAL PRECIPITATION.

The normal precipitation for the month of March is less than 1.00 over the Rocky Mountain and plateau regions and has a maximum of 8.00 over the higher portions of the Sierra Nevada range and on the immediate coast of Washington and Oregon, but diminishes rapidly as we proceed eastward to the summit of the Rocky Mountains. A normal of from 6.00 to 8.00 prevails over the Gulf States east of Texas and northward along the Appalachian range to southwestern Virginia. From 4.00 to 6.00 occur on the immediate Atlantic coast of the Middle and Eastern States.

PRECIPITATION FOR MARCH, 1894.

The total precipitation for March, 1894, exceeded 10.00 on the immediate coast of Oregon and Washington, and dimin-

ished from 10.00 on the northern coast of California to less than 1.00 at stations south of San Francisco. An area of 10.00 to 14.00 exists in southern Arkansas, and 4.00 or more fell over eastern Texas, eastern Oklahoma, Indian Territory, southern Missouri, western Tennessee, all of Arkansas, Louisiana, Mississippi, Alabama, and northeastern Florida. Little or no rain fell at a few stations in southern California and western Texas.

DEPARTURES FROM NORMAL PRECIPITATION.

The precipitation for March was decidedly in excess of the normal in Arkansas, Oregon, Washington, North Dakota, Minnesota, and Lake Superior; it was decidedly deficient in California and the Atlantic States from Georgia to Maine. The principal deficits were: San Francisco, Cal., 2.7; Atlanta, Ga., Augusta, Me., and Washington, D. C., 3.2; Knoxville, Tenn., and Hatteras, N. C., 3.3; Boston, Mass., 3.4; New Haven, Conn., 3.6; Charlotte, N. C., 3.7; Eastport, Me., 3.8; Kittyhawk, N. C., 3.9. The principal excesses were: Neah Bay, Wash., 5.6; Roseburg, Oreg., 5.3; Astoria, Oreg., 7.2; Memphis, Tenn., 5.1; Little Rock, Ark., 4.2; Mobile, Ala., 4.1; Fort Smith, Ark., 4.0.

Considered by districts the precipitation for March, 1894, when compared with the normal for the month, furnishes the following percentages (precipitation is in excess when the percentage of the normal exceeds 100): Northern plateau, 228; northern slope, 238; North Dakota, 232; north Pacific, 172; west Gulf States, 144; upper Lake region, 122; upper Mississippi Valley, 115; southern slope (Abilene, Tex.), 106; east Gulf States, 105; southern plateau and Key West, Fla., 100; Missouri Valley, 95; middle plateau, 77; Ohio Valley and Tennessee, 76; middle Pacific coast, 70; lower Lake region, 63; south Atlantic States, 48; middle slope, 42; middle Atlantic States, 40; New England, 37; south Pacific, 30.

The following table shows for certain stations, as reported by voluntary observers, (1) the average precipitation for March for a series of years; (2) the length of record during which the observations have been taken and from which the average has been computed; (3) the total precipitation for March, 1894; (4) the departure of the current month from the average; (5) the extremes for March and the years of occurrence during the period of observation:

State and station.	(1) Average for the month of March.	(2) Length of record.	(3) Total for March, 1894.	(4) Departure from average.	(5) Extremes for March.			
					Greatest.		Least.	
					Am't.	Year.	Am't.	Year.
<i>Arizona.</i>	<i>Inches.</i>	<i>Years.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>
Fort Apache	1.68	18	1.36	- 0.32	4.44	1884	0.03	1879
Fort Mohave	0.48	23	.....	2.50	1889	0.00	.....	.....
Whipple Barracks	1.51	22	0.88	- 0.63	5.51	1884	0.00	1882
<i>Arkansas.</i>								
Keesee Ferry	3.84	12	9.17	+ 5.33	9.17	1894	2.78	1892
<i>California.</i>								
Riverside	2.32	13	0.72	- 1.60	8.52	1886	0.00	1888
<i>Colorado.</i>								
Las Animas	0.69	12	T.	- 0.69	2.43	1891	0.00	1890
<i>Florida.</i>								
Merritts Island	2.57	16	0.84	- 1.73	7.92	1878	0.56	1892
<i>Georgia.</i>								
Forsyth	7.17	20	3.71	- 3.46	12.87	1875	1.37	1878
<i>Idaho.</i>								
Boise Barracks	1.70	20	1.64	- 0.06	7.66	1871	0.03	1885
Fort Sherman	2.00	11	7.00	+ 5.00	7.00	1894	0.14	1882
<i>Indiana.</i>								
Lafayette	2.70	14	2.81	+ 0.11	4.25	1886	0.46	1885
<i>Iowa.</i>								
Cresco	1.82	21	2.57	+ 0.75	4.55	1888	0.22	1889
<i>Kansas.</i>								
Independence	2.21	22	2.73	+ 0.52	5.54	1892	0.43	1872
<i>Louisiana.</i>								
Grand Coteau	4.72	11	8.68	+ 3.96	10.20	1884	0.80	1891
<i>Maine.</i>								
Orono	4.27	23	1.23	- 3.04	8.20	1876	1.23	1894
<i>Maryland.</i>								
Cumberland	2.99	22	1.33	- 1.66	7.47	1891	0.50	1872
<i>Michigan.</i>								
Kalamazoo	2.42	18	1.30	- 1.12	7.33	1877	0.42	1883
<i>Missouri.</i>								
Sedalia	2.60	16	2.33	- 0.27	7.67	1888	0.43	1879

Departures from average precipitation—Continued.

State and station.	(1) Average for the month of Mar.	(2) Length of record.	(3) Total for Mar., 1894.	(4) Departure from average.	(5) Extremes for March.			
					Greatest.		Least.	
					Am't.	Year.	Am't.	Year.
<i>Montana.</i>	<i>Inches.</i>	<i>Years.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>
Fort Custer	0.53	14	1.80	+ 1.27	1.80	1894	0.07	1882
<i>Nebraska.</i>								
Fort Robinson	1.16	10	1.31	+ 0.15	1.83	1888	T.	1889
Genoa (near)	1.28	18	0.60	- 0.68	3.55	1876	T.	1882
<i>Nevada.</i>								
Browns	0.35	22	.....	.....	2.00	1883	0.00	*
Carson City	1.45	17	0.97	- 0.48	4.22	1882	0.18	1875
<i>New Hampshire.</i>								
Hanover	2.32	23	1.10	- 1.22	5.25	1888	0.28	1876
<i>New Mexico.</i>								
Fort Wingate	1.05	23	1.30	+ 0.25	2.70	1890	0.02	1887
<i>New York.</i>								
Cooperstown	2.86	23	1.92	- 0.94	5.29	1871	0.55	1885
Plattsburg Barracks	1.99	23	1.91	- 0.08	3.68	1873	0.08	1889
<i>North Carolina.</i>								
Lenoir	4.03	22	1.16	- 2.87	10.20	1875	0.50	1879
<i>Oklahoma.</i>								
Fort Reno	1.67	11	1.90	+ 0.23	3.10	1892	0.00	1886
Fort Sill	1.50	22	2.82	+ 1.32	4.52	1871	0.03	1872
Fort Supply	1.46	15	0.12	- 1.34	7.62	1876	0.00	1887, '90
<i>Oregon.</i>								
Bandon	7.03	16	18.52	+ 11.49	18.52	1894	0.63	1885
<i>Pennsylvania.</i>								
Dyberry	3.12	23	1.55	- 1.57	5.00	1890	1.03	1885
Grampian	3.88	23	2.27	- 1.61	6.89	1875	1.34	1885
Wellsboro	4.94	14	0.24	- 4.70	10.08	1884	0.24	1894
<i>South Carolina.</i>								
Statesburg	3.92	13	2.52	- 1.40	7.62	1891	0.97	1887
<i>South Dakota.</i>								
Fort Sully	1.12	23	2.60	+ 1.48	9.60	1871	T.	1887
<i>Texas.</i>								
Austin	2.49	22	.....	.....	5.60	1876	0.58	1890
Silver Falls	0.60	6	T.	- 0.60	1.03	1892	0.00	1889
<i>Utah.</i>								
Terrace	0.42	21	1.10	+ 0.68	1.74	1884	0.00	*
<i>Vermont.</i>								
Stratford	3.46	21	1.10	- 2.36	4.10	1876	1.10	1894
<i>Virginia.</i>								
Dale Enterprise	3.40	14	0.50	- 2.90	6.86	1886	0.50	1894
<i>Washington.</i>								
Fort Townsend	1.82	18	1.92	+ 0.10	4.32	1876	0.11	1884
<i>West Virginia.</i>								
Parkersburg	2.93	8	2.31	- 0.62	6.95	1890	0.80	1885
<i>Wisconsin.</i>								
Madison	2.60	23	1.73	- 0.87	4.73	1882	0.30	1883
<i>Wyoming.</i>								
Fort Washakie	0.66	11	2.67	+ 2.01	2.67	1894	0.06	1889

*Frequently.

ACCUMULATED PRECIPITATION.

From the beginning of the year to the end of March, 1894, the total precipitation was in excess of the normal decidedly in the northern plateau and north Pacific regions, as also in North Dakota and the east Gulf States; it was especially deficient on the south Pacific coast and in New England. In detail the accumulated precipitation, as compared with the normal value, furnishes the following percentages: Northern plateau, 165; north Pacific coast and North Dakota, 130; northern slope, 137; east Gulf States, 112; Missouri Valley and southern slope (Abilene, Tex.), 100; west Gulf States, 99; upper Mississippi Valley, 97; upper Lake region and middle plateau, 95; middle Pacific coast, 94; Ohio Valley and Tennessee, 88; lower Lake region, 84; middle and south Atlantic States, 76; middle slope, 72; southern plateau, 70; New England States, 69; Key West, Fla., 48; south Pacific coast, 44.

YEARS OF GREATEST PRECIPITATION FOR MARCH.

The precipitation was the greatest on record for the month of March at the stations shown in the following table:

Station.	Current precipitation.		Previous maximum.	
	Amount.	Departure.	Amount.	Year.
Roseburg, Oreg	8.61	+ 5.3	8.60	1879
Spokane, Wash	2.65	+ 1.3	2.50	1887
Walla Walla, Wash	3.75	+ 2.2	2.45	1890
Miles City, Mont	4.03	+ 3.5	0.51	1880
Duluth, Minn	4.30	+ 2.8	3.13	1891
St. Paul, Minn	3.28	+ 1.9	3.25	1882
Fort Smith, Ark	6.82	+ 4.0	5.99	1890
Little Rock, Ark	9.08	+ 4.2	7.60	1880

YEARS OF LEAST PRECIPITATION FOR MARCH.

The current precipitation was the least on record for March at the stations shown in the following table:

Station.	Current precipitation.		Previous maximum.	
	Amount.	Departure.	Amount.	Year.
San Francisco, Cal	0.60	-2.7	0.78	1873
Fresno, Cal	0.29	-1.0	0.81	1891
Eastport, Me.	1.19	-3.8	1.35	1893
Northfield, Vt.	1.06	-2.3	1.13	1892
Boston, Mass.	1.01	-3.4	1.15	1885
New Haven, Conn.	1.15	-3.6	1.19	1885
Baltimore, Md.	1.19	-2.9	1.38	1893
Washington, D. C.	0.98	-3.2	1.53	1885
Lynchburg, Va.	0.95	-3.9	1.03	1893
Charlotte, N. C.	1.04	-3.7	1.62	1889
Titusville, Fla.	0.64	-2.4	1.30	1892
Jupiter, Fla.	0.69	-1.0	1.19	1891

EXCESSIVE PRECIPITATION.

The following tables for March, 1894, show, by states, the number of stations reporting total precipitation to equal or exceed 10.00 inches during this month; 2.50 in 24 hours, and 1.00 in 1 hour:

Monthly precipitation to equal or exceed 10.00.

State.	Number of stations.	State.	Number of stations.
Oregon	23	Louisiana	3
Arkansas	20	Alabama	1
Washington	7	Mississippi	1
California	4	Tennessee	1

Daily precipitation to equal or exceed 2.50 in 24 hours.

State.	Number of stations.	Dates.	State.	Number of stations.	Dates.
Arkansas	39	4-5, 5, 5-6, 6, 14, 17-18, 17-19, 18-19, 18-20, 19, 19-20, 19-21.	Mississippi	7	5-6, 6, 15-16, 19-20.
Louisiana	18	5, 5-6, 6, 8, 16, 19, 19-20, 20.	Tennessee	4	18, 18-19, 20.
Missouri	12	4-5, 5, 5-6, 19-20.	Alabama	3	16, 16-17, 25.
Texas	9	5, 17-18, 18, 19, 19-20.	Washington	3	15, 27-28, 28.
Oregon	7	8, 11, 11-12, 13-14, 14, 15, 30.	Georgia	2	23, 25.
			California	1	11.
			Florida	1	8.
			Indiana	1	22.
			Indian Territory	1	18.
			Montana	1	19-20.
			South Dakota	1	16.

Hourly precipitation to equal or exceed 1.00.

Alabama	3	11, 17, 20, 25.	Louisiana	1	5.
Mississippi	3	16, 20, 22.	Tennessee	1	20.
Missouri	3	4, 5, 18.	Texas	1	17.
Arkansas	1	18.			

Excessive precipitation, March, 1894.

State and station.	Monthly rainfall to inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
Alabama.						
Brewton	<i>Inches.</i>	<i>Inches.</i>		<i>Inches</i>	<i>A. m.</i>	
Elba		3.00	16			
Maple Grove		4.65	25	4.65	3 00	25
Mobile	11.51	6.16	16-17	1.20	1 00	11
Do				3.25	1 40	17
				1.32	1 00	20
Arkansas.						
Arkadelphia	11.35	6.95	18-20			
Arkansas City		3.10	5			
Ashdown		4.55	19			
Blanchard Springs		4.17	19-20			
Brinkley	13.35	2.50	5-6			
Do		8.90	19-21			
Camden a.	12.13	6.52	18-20			
Camden b.	11.87	6.39	19-20			
Cassville		3.20	5			
Conway		5.10	19-20			
Cornerstone	14.25	2.50	6			
Do		8.02	18-20			

Excessive precipitation—Continued.

State and station.	Monthly rainfall to inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
Arkansas—Continued.		Inches.	Inches.	Inches.	A. m.	
Corning	11.22	2.61	5-6	1.08	0 13	18
Dardanelle	11.28	5.41	19-20			
Dallas		6.00	18-19			
Fayetteville		3.40	4-5			
Forrest	14.70	6.30	18-19			
Fort Smith		2.94	17-18			
Fulton		8.26	17-19			
Gaines Landing	10.85	3.90	5			
Do		3.60	19			
Hamburg	10.57	3.06	5-6			
Do		3.15	19			
Helena a.		2.52	5-6			
Do		3.76	19-20			
Helena b.		3.56	19-20			
Hot Springs	10.40	4.10	19-20			
Hot Springs (near)		4.00	19-20			
Keesee Ferry		3.37	5			
Kirby	10.40	6.50	18-19			
Little Rock		6.07	18-20			
Lonoke	13.00	5.00	19			
Madding	18.20	3.25	14			
Do		8.13	18-19			
Mount Ida	11.73	5.65	18-19			
Mount Nebo	10.10					
New Gascony	14.25	2.50	5-6			
Do		4.37	18-19			
Osceola		2.80	5-6			
Ozark		2.77	5			
Do		2.49	18			
Rison	10.12	4.31	18-19			
Rogers		3.20	4-5			
Russellville		2.70	4-5			
Stuttgart	14.33	2.60	5			
Do		6.41	19			
Washington	12.27	9.10	18-19			
Wiggs		4.30	19			
Winslow		2.60	4-5			
California.						
Crescent City	14.11	3.01	11			
Crescent City L. H.	15.41					
Point George	13.56					
Florida.						
Pensacola		2.92	8			
Georgia.						
Bainbridge b.		2.75	23			
Piscola		2.80	25			
Indiana.						
Marengo		2.50	22			
Indian Territory.						
Eufaula		3.90	17-18			
Kemp		3.17	18			
Louisiana.						
Abbeville		4.00	19-20			
Bastrop		3.35	5-6			
Do		3.99	19-20			
Baton Rouge		2.50	16			
Calhoun		3.09	6			
Do		3.73	19-20			
Coushatta a.	10.68	2.76	5-6			
Do		5.73	19-20			
Coushatta b.	10.46	3.15	5-6			
Do		5.96	19-20			
Farmersville		3.35	5			
Do		2.83	19			
Girard		3.23	19-20			
Grand Coteau		3.72	16			
Lawrence		2.50	8			
Liberty Hill		3.11	5			
Do		4.40	19			
Melville		4.00	16			
Minden		5.15	19-20			
Monroe	10.48	2.90	5-6			
Do		5.65	19-20			
Natchitoches		2.76	20			
Plain Dealing		3.12	19			
Shreveport		3.26	19-20			
Sugartown		2.55	19			
Winnboro				2.00	2 00	5
Mississippi.						
Batesville		2.72	6			
Clarksdale		2.49	5-6			
Edwards	10.11			2.25	2 00	22
Greenville a.		2.96	5-6			
Greenville b.		2.96	5-6			
Hernando		3.63	19-20			
Louisville		2.76	15-16			
Meridian				1.12	0 35	16
Do				1.02	1 00	22
Palo Alto		2.56	15-16			
Vicksburg				1.33	1 00	20
Missouri.						
Arlington		2.90	5			
Birch Tree		3.05	5-6			
Cowgill		3.00	4-5			
Gayoso		2.95	19-20			
Grovedale		2.66	5			
Houston		3.13	5			
Ironton		2.60	5-6			
Kansas City				1.00	1 00	4
Lebanon				1.50	0 30	18

Table of excessive precipitation—Continued.

State and station.	Monthly rainfall to inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
<i>Missouri—Continued.</i>						
Noosho	<i>Inches.</i>	<i>Inches.</i>		<i>Inches</i>	<i>h. m.</i>	
Olden		3.20	5-6	2.41	1 30	5
Panacea		3.12	5-6			
Poplar Bluff		2.80	5-6			
Round Spring		2.96	5-6			
Sublette		2.50	4-5			
<i>Montana.</i>						
Miles City		2.80	19-20			
<i>Oregon.</i>						
Albany a.	10.45					
Astoria	14.04					
Aurora (near)	11.51	2.73	15			
Bandon	18.52	3.90	11			
Do.		2.50	15			
Cascade Locks	16.52					
Comstock	11.90					
Cornelius	10.84					
Corvallis (near)	11.00					
Gardiner	13.63					
Glenora	25.63	3.22	8			
Do.		5.64	15			
Hood River	17.21	7.40	13-14			
Hood River (near)	12.67					
Lafayette	11.55					
Langlois	20.65	6.62	11-12			
McMinnville a.	10.25	2.71	15			
McMinnville b.	10.26					
Newport	13.12					
Salem a.	10.37					
Salem b.	10.13					
Springbrook	10.27					
Springfield	10.18					
Toledo	19.12	2.55	14			
Do.		2.80	30			
West Fork	11.16					
<i>South Dakota.</i>						
Faulkton		2.50	10			
<i>Tennessee.</i>						
Bolivar		3.25	18			
Chattanooga		2.62	20	1.04	0 54	20
Covington		4.74	18-19			
Memphis	10.90	6.05	18-19			
<i>Texas.</i>						
Arlington		3.60	19-20			
Arthur City		5.41	17-18			
Dallas		4.62	19-20			
Duval		2.60	19			
Estella		3.88	19-20			
Graham				1.13	1 00	17
Longview		3.10	19			
Mountain Spring		4.45	19-20			
Paris		2.60	5			
Do.		2.65	18			
Waco		3.45	18			
<i>Washington.</i>						
Aberdeen	12.53					
East Clallam	13.99					
Lapush	13.14	2.84	28			
Neah Bay	13.70					
Pysht	10.11					
Tatoosh Island	12.32	2.84	27-28			
Union City	12.93	2.56	15			

Excessive precipitation received too late for publication in February, 1894.

<i>Alabama.</i>						
Eufaula c.	10.61	5.33	10-11			
<i>California.</i>						
Upper Lake	10.43	2.90	14			
Do.		3.48	20			
<i>Georgia.</i>						
Columbus		3.01	11			
Thomasville	10.07	2.50	20			
<i>Tennessee.</i>						
Kingston		5.50	3-4			

MAXIMUM RAINFALL IN ONE HOUR OR LESS.

The following table is a record of the heaviest rainfalls during March, 1894, for periods of five, ten, and sixty minutes, as reported by regular stations of the Weather Bureau furnished with self-registering rain gauges. This record refers strictly to rainfall. About 37 stations are furnished with the self-registering float rain gauge and 6 with the self-registering, weighing, rain and snow gauge. The float gauge does not record snowfall, and the frequent interruptions of both the self-registers, due to snow and ice, explain the occurrence of incomplete records.

Maximum rainfall in one hour or less.

Station.	Maximum rainfall in—					
	5 min.	Date.	10 min.	Date.	1 hour.	Date.
Atlanta, Ga.	Inch.		Inch.		Inch.	
Baltimore, Md.	0.18	16	0.25	16	0.49	16
Boston, Mass.	0.12	23	0.15	23	0.30	23
Buffalo, N. Y.	0.02	23	0.03	23	0.09	23
Cincinnati, Ohio	0.21	21	0.24	21	0.28	21
Chicago, Ill.	0.15	22	0.20	22	0.30	15
Cleveland, Ohio	0.05	5	0.07	5	0.19	5
Detroit, Mich.	0.04	22	0.05	22	0.23	22
Duluth, Minn.	0.04	6	0.08	6	0.14	22
Eastport, Me.	0.10	10	0.11	10	0.20	4, 10
Galveston, Tex.	0.01	18	0.02	18	0.10	18
Indianapolis, Ind.	0.35	22	0.59	22	0.98	22
Jacksonville, Fla.	0.10	22	0.15	22	0.47	22
Jupiter, Fla.	0.12	9	0.20	9	0.35	25
Kansas City, Mo.	0.20	26	0.25	26	0.25	26
Key West, Fla.	0.15	4	0.27	4	1.00	4
Memphis, Tenn.	0.24	1	0.33	1	0.65	1
Nantucket, Mass.	0.20	19, 22	0.30	19	0.70	18, 19
Nashville, Tenn.	0.03	29	0.05	29	0.19	29
New Orleans, La.	0.10	22	0.12	22	0.17	15
New York, N. Y.	0.27	24	0.45	20	0.97	20
Norfolk, Va.	0.05	23	0.08	23	0.23	23
Philadelphia, Pa.	0.06	29	0.08	29	0.30	29
Portland, Ore.	0.11	23	0.13	23	0.28	23
Rochester, N. Y.	0.03	8	0.05	8	0.19	8
St. Louis, Mo.	0.05	22	0.10	22	0.24	22
St. Paul, Minn.	0.12	5	0.15	5	0.50	5
San Diego, Cal.	0.04	4	0.08	4	0.19	4
San Francisco, Cal.	0.02	2	0.04	2	0.15	2
Savannah, Ga.	0.05	1	0.06	1	0.22	1
Vicksburg, Miss.	0.05	1	0.07	1	0.31	1
Washington, D. C.	0.35	20	0.68	20	1.33	20
Wilmington, N. C.	0.02	21	0.03	21	0.17	21
	0.03	25	0.06	25	0.25	25

*Record incomplete.

FREQUENCY OF HEAVY PRECIPITATION SINCE 1871.

The following tables show the number of years for which monthly precipitation to equal or exceed 10.00 inches, daily precipitation to equal or exceed 2.50 inches, and hourly precipitation to equal or exceed 1.00 inch has been reported at regular stations of the Weather Bureau in the several States and Territories for March during the last 24 years:

Frequency of excessive monthly precipitation.

State.	No. years noted.	State.	No. years noted.
Georgia	13	Kentucky	1
Alabama	13	Kansas	1
California	12	Maryland	1
Washington	11	Nebraska	1
Oregon	10	Ohio	1
Mississippi	10	Rhode Island	1
Tennessee	9	Utah	1
North Carolina	9	Arizona	0
Louisiana	7	Colorado	0
Florida	6	District of Columbia	0
Arkansas	6	Idaho	0
Massachusetts	4	Indian Territory	0
South Carolina	4	Iowa	0
Texas	4	Maine	0
Connecticut	3	Michigan	0
Illinois	3	Minnesota	0
New Hampshire	3	Missouri	0
New York	3	Montana	0
Indiana	2	Nevada	0
New Jersey	2	New Mexico	0
Pennsylvania	2	The Dakotas	0
Virginia	2	Vermont	0
Wisconsin	2	West Virginia	0
Delaware	1	Wyoming	0

Frequency of excessive daily precipitation.

Alabama	19	Ohio	4
Georgia	17	Iowa	4
Louisiana	15	Kentucky	4
Texas	14	Virginia	4
Florida	14	Kansas	3
Tennessee	13	Maryland	3
North Carolina	12	New Jersey	3
Mississippi	11	Pennsylvania	3
Arkansas	10	The Dakotas	3
Indiana	9	Vermont	2
Illinois	8	Colorado	2
South Carolina	6	Rhode Island	2
Massachusetts	6	Missouri	2
New York	6	Indian Territory	2
California	6	Utah	1
Washington	6	Arizona	1
Connecticut	5	District of Columbia	1
Oregon	5	Montana	1

Frequency of excessive daily precipitation—Continued.

State.	No. years noted.	State.	No. years noted.
Delaware	0	Nevada	0
Idaho	0	New Hampshire	0
Maine	0	New Mexico	0
Michigan	0	West Virginia	0
Minnesota	0	Wisconsin	0
Nebraska	0	Wyoming	0

Frequency of excessive hourly precipitation.

Texas	9	Kansas	0
Tennessee	7	Kentucky	0
Florida	6	Maine	0
North Carolina	4	Maryland	0
Louisiana	4	Massachusetts	0
Alabama	3	Michigan	0
Arkansas	3	Minnesota	0
Georgia	2	Montana	0
Virginia	2	Nebraska	0
Mississippi	2	Nevada	0
Missouri	2	New Hampshire	0
New York	1	New Jersey	0
Pennsylvania	1	New Mexico	0
Indiana	1	Ohio	0
Arizona	0	Oregon	0
California	0	Rhode Island	0
Colorado	0	South Carolina	0
Connecticut	0	The Dakotas	0
Delaware	0	Utah	0
District of Columbia	0	Vermont	0
Idaho	0	Washington	0
Illinois	0	West Virginia	0
Indian Territory	0	Wisconsin	0
Iowa	0	Wyoming	0

EXCEPTIONAL PRECIPITATION.

The following tables give exceptionally heavy monthly, daily, and hourly precipitation reported for March by any station, regular or voluntary, and in any year since 1871:

Exceptional monthly precipitation.

Station and state.	Am't.	Year.	Station and state.	Am't.	Year.
	Inches.			Inches.	
Delta, Cal.	37.53	1889	Dunsmuir, Cal.	21.39	1889
Glenora, Oreg.	25.03	1894	Summit, Cal.	21.05	1879
Cisco, Cal.	25.30	1882	Fort Stevens, Oreg.	20.70	1873
Alta, Cal.	24.30	1879	Langlois, Oreg.	20.65	1894
Neah Bay, Wash.	23.83	1879	Carlisle, Ala.	20.50	1875
Emigrant Gap, Cal.	22.12	1874	Terrell, Tex.	20.12	1875
Do	21.69	1879	Bellevue, Nebr.	20.00	1882

Exceptional daily precipitation.

Station and state.	Amount.	Date.	Station and state.	Amount.	Date.
	Inches.			Inches.	
Okaloosa, La.	12.65	9, 1878	Fayetteville, N. C.	6.00	28, 1882
Kosciusko, Miss.	12.60	5-7, 1891	Dallas, Ark.	6.00	18-19, 1894
Washington, Ark.	9.10	18-19, 1894	Sturdevant, Ala.	5.91	24-25, 1892
Brinkley, Ark.	8.00	19-21, 1894	Coushatta, La. &	5.90	19-20, 1894
Fulton, Ark.	8.26	17-19, 1894	Palestine, Tex.	5.75	3-4, 1888
Georgetown, Cal.	8.25	19-20, 1893	Coushatta, La. &	5.73	19-20, 1894
Madding, Ark.	8.13	18-19, 1894	Mount Ida, Ark.	5.65	18-19, 1894
Kennedy & Id Mine, Cal.	8.06	18-21, 1893	Monroe, La.	5.65	19-20, 1894
Fort Stevens, Oreg.	8.05	23-25, 1879	Canton, Miss.	5.65	7-8, 1891
Cornerstone, Ark.	8.02	18-20, 1894	Glenora, Oreg.	5.64	15, 1894
South Fork, Ky.	8.007	22, 1890	Loudon, Tenn.	5.61	30, 1886
Chattanooga, Tenn.	7.61	29-30, 1886	Knoxville, Tenn.	5.56	29-30, 1886
Hood River, Oreg.	7.40	13-14, 1894	Glendora, Cal.	5.56	20, 1893
Atlanta, Ga.	7.36	29, 1886	Oleta, Cal.	5.50	19-20, 1893
Montgomery, Ala.	7.24	26-27, 1888	Columbus, Miss.	5.48	5-6, 1891
Arkadelphia, Ark.	6.95	18-20, 1894	Dardanelle, Ark.	5.41	19-20, 1894
Rising Sun, Ind.	6.90	5-6, 1874	Arthur City, Tex.	5.41	17-18, 1894
Hatteras, N. C.	6.72	30, 1879	Diamond, Ga.	5.40	7-8, 1891
Viaden, Miss.	6.71	7-8, 1891	Rabun Gap, Ga.	5.40	28, 1888
Creswell, Kans.	6.70	31, 1876	Clinton, Tenn.	5.30	30, 1886
Langlois, Oreg.	6.62	11-12, 1894	Wilmington, N. C.	5.26	27, 1882
Charleston, Tenn.	6.57	30, 1886	Sharp, Tenn.	5.23	7-8, 1891
Camden, Ark. &	6.52	18-20, 1894	Minden, La.	5.15	19-20, 1894
Kirby, Ark.	6.50	18-19, 1894	Union Springs, Ala.	5.12	23-24, 1892
Vicksburg, Miss.	6.47	7-8, 1891	Hawkinsville, Ga.	5.12	25-26, 1892
Mobile, Ala.	6.45	24, 1872	Conway, Ark.	5.10	19-20, 1894
Stuttgart, Ark.	6.41	19, 1894	Marshallville, Ga.	5.07	25, 1892
Camden, Ark. &	6.39	19-20, 1894	Hatteras, N. C.	5.06	21-22, 1877
Forrest, Ark.	6.30	18-19, 1894	Point Pleasant, La.	5.01	14-15, 1880
Union Springs, Ala.	6.20	27, 1888	Thayer, Mo.	5.01	10-11, 1890
Mobile, Ala.	6.16	16-17, 1894	Henderson, N. C.	5.00	7-8, 1891
Winnsboro, La.	6.10	7-8, 1891	Fort Sully, S. Dak.	5.00	21-22, 1871
Little Rock, Ark.	6.07	18-20, 1894	Tiffin, Ohio	5.00	12-13, 1874
Memphis, Tenn.	6.05	18-19, 1894	Marengo, Ind.	5.00	12-13, 1890
Lake Charles, La.	6.00	20, 1893	Lake Charles, La.	5.00	12-13, 1890
Clarksville, Tex.	6.00	28, 1875	Lonoke, Ark.	5.00	19, 1894
Terrell, Tex.	6.00	5, 1876			

Exceptional precipitation for one hour or less.

Station and state.	Amount.	Time.	Date.
	Inches.	A. M.	
Galveston, Tex.	0.35	0 05	22, 1894
Vicksburg, Miss.	0.35	0 05	20, 1894
Wilmington, N. C.	0.34	0 05	18, 1892
St. Louis, Mo.	0.30	0 05	27, 1890
New Orleans, La.	0.27	0 05	24, 1894
Jupiter, Fla.	0.25	0 05	23, 1890
Do	0.25	0 05	7, 1892
Stuttgart, Ark.	1.20	0 10	23, 1893
Vicksburg, Miss.	0.68	0 10	20, 1894
St. Louis, Mo.	0.60	0 10	27, 1890
Key West, Fla.	0.35	0 10	27, 1891
Corning, Ark.	1.08	0 13	18, 1894
Centralia, Ill.	1.33	0 15	28, 1890
Howe, Tex.	1.75	0 20	21, 1890
Merkel, Tex.	1.56	0 30	20, 1890
Biscayne, Fla.	4.10	0 30	28, 1874
Kingston Springs, Tenn.	1.67	0 30	25, 1884
Lebanon, Mo.	1.50	0 30	18, 1894
Jupiter, Fla.	2.95	0 33	26, 1893
Terrell, Tex.	4.00	1 00	19, 1876

MONTHLY SNOWFALL.

The depth of snow that fell during the month of March, 1894, as reported by both regular and voluntary observers, is shown by the lines and figures on Chart V, which also gives, by the full line, the limit of the region within which a minimum temperature of 32° F. was at any time reported during the month, and by the dotted line is given a similar limit for 40°. The temperature of 40° within a thermometer shelter is very apt to be accompanied by frosts on the open surface of the ground. The minimum air temperatures within Weather Bureau shelters are, of course, higher than the temperatures recorded by thermometers in the open air and nearer the surface of the ground such as is the usual exposure among voluntary observers. The actual depth of snowfall, when above 10 inches, is given in a table in the following section in connection with the depth of snow on the ground. As compared with the normal it will be seen that the snowfall for March was in excess in the Lake Superior region.

SPECIAL SNOWFALL, MARCH 25-30, 1894.

The following table shows the time of beginning and ending and the total depth of snowfall reported during the severe cold wave of March 25-30, 1894, at stations south of the Ohio and east of the Mississippi rivers, and also includes stations in Arkansas, Missouri, Oklahoma, Indian Territory, and Texas:

Stations.	Beginning and ending.	Depth.
		Inches.
Alabama.		
Carrollton	Morning, 29th	T.
Florence	28th	1.0
Livingston	29th	T.
Newburg	9 p. m., 28th, to 5 a. m., 29th	1.0
Scottsboro	29th	T.
Union	29th	1.0
Arkansas.		
Blanchard Springs	2 p. m. to 9 p. m., 28th	T.
Brinkley	1 p. m. to 5 p. m., 28th	2.0
Cassville	28th	0.7
Conway	11 a. m. to 6 p. m., 28th	2.0
Cornerstone	5.15 p. m. to 8 p. m., 28th	2.0
Corning	9 a. m. to 5 p. m., 28th	3.0
Dardanelle	28th	2.0
Dallas	9 a. m. to 2 p. m., 28th	1.0
Fayetteville	Noon to 2 p. m.	1.0
Forrest City	29th	2.0
Fort Smith	11.45 a. m. to 2.35 p. m., 28th	0.2
Gaines Landing	Night of 27th	4.0
Hamburg	29th	2.0
Helena	6 p. m., 28th, to early a. m., 29th	1.0
Keesees Ferry	28th	0.1
Kirby	28th	2.0
Little Rock	5.30 p. m. to 8.07 p. m., 28th	1.0
Lonoke	11 a. m. to 7 p. m., 28th	2.0
Madding	29th	2.0
Mount Ida	28th	3.0
Mount Nebo	10 a. m. to 4 p. m., 29th	2.0
Newport	11 a. m. to 7 p. m., 28th	1.0
Oseola	28th	2.0
Rison	28th	1.0
Russellville	11 a. m. to 3 p. m., 28th	T.
Searcy	9 a. m. to 7 p. m., 28th	4.0
Stuttgart	28th	0.5

Special snowfall—Continued.

Special snowfall—Continued.

Stations.	Beginning and ending.	Depth.
<i>Arkansas—Continued.</i>		
Washington	Noon to 7 p. m., 28th	0.2
Winslow	9 a. m. to 1 p. m.	2.5
<i>Georgia</i>		
Diamond	29th	1.0
Marietta	29th	T.
<i>Indian Territory.</i>		
Eufaula	28th	T.
Gwendale	28th	T.
Lehigh	27th	T.
South McAlester	28th	T.
<i>Kentucky.</i>		
Blandville	10 a. m. to 7 p. m., 28th	2.0
Bowling Green	9 p. m., 27th, to early a. m., 28th	2.0
Burnside	29th	1.0
Canton	28th	1.0
Catlettsburg	1 p. m., 28th, to 7.30 a. m., 29th	1.0
Edmonton	29th	2.0
Elizabethtown	28th	2.0
Eubanks	29th	2.0
Falmouth	29th	1.0
Franklin	8 p. m., 28th, to 6 a. m., 29th	1.5
Greensburg	10 p. m., 28th, to 8.30 a. m., 29th	1.0
Harrodsburg	29th	1.0
Hendricks	29th	1.0
Mount Sterling	Early a. m. to 9 a. m., 29th	1.9
Paducah	4 p. m. to 11 p. m., 29th	1.5
Richmond	29th	2.0
Russellville	29th	1.5
Shelbyville	6.30 p. m., 28th, to 9 a. m., 29th	2.0
Springfield	28th	1.5
<i>Louisiana.</i>		
Bastrop	29th	T.
Lake Providence	5 p. m. to 9 p. m., 28th	1.0
Plain Dealing	28th	0.1
<i>Maryland.</i>		
Oakland	Night, 28th, to 11 p. m., 26th	5.0
Sunnyside	6 a. m., 25th, to 7 p. m., 26th	8.0
<i>Mississippi.</i>		
Aberdeen	29th	1.0
Agricultural College	29th	1.0
Batesville	29th	1.5
Canton	29th	0.8
Clarksdale	4 p. m. to 9 p. m., 28th	2.0
Duck Hill	28th	T.
Greenville	29th	0.5
Itta Bena	4 p. m. to 10 p. m., 28th	1.0
Kosciusko	Night of 28th	0.5
Louisville	8 p. m., 28th, to early a. m., 29th	2.0
Macon	11 p. m., 28th, to 1 a. m., 29th	0.1
Meridian	29th	T.
Okolona	7 p. m. to 11 p. m., 29th	T.
Palo Alto	9 p. m. to midnight, 28th	1.0
Pontotoc	6 p. m. to midnight, 28th	3.0
Topton	29th	0.3
University	29th	0.8
Vicksburg	29th	T.
Water Valley	28th	2.0
<i>Missouri.</i>		
Big Piney	8 a. m. to 2 p. m., 28th	3.0
Half Way	28th	1.0
Houston	11 a. m. to 1 p. m., 28th	1.0
Lebanon	28th	2.0
Panacea	8 a. m. to 10 p. m., 28th	2.5
Poplar Bluff	28th	1.0
Potosi	10 a. m. to 2.30 p. m., 28th	1.0
Sarcozie	7.30 a. m. to 11.20 p. m., 28th	1.5
Virgil City	28th	1.0
<i>North Carolina.</i>		
Blowing Rock	29th	T.
Henderson	26th	1.5
Highlands	28th	2.0
Horse Cove	29th	1.2
Littleton	25th	1.2
Louisburg	3 a. m. to 8 a. m., 25th	2.0
Washington	26th	1.0
<i>Oklahoma.</i>		
Arapaho	28th	0.5
Burnett	28th	0.2
Clifton	28th	0.5
Stillwater	28th	0.2
<i>South Carolina.</i>		
Blacksburg	29th	T.
Gaffney	7 a. m. to 8 a. m., 29th	F.
<i>Tennessee.</i>		
Ashwood	29th	0.8
Bolivar	28th	1.0
Bristol	29th	1.0
Byrdstown	29th	2.8
Carthage	11.10 p. m., 28th, to 6.20 a. m., 29th	1.5
Clarksville	7.30 p. m., 28th, to midnight, 29th	2.0
Covington	3 p. m. to midnight, 28th	2.0
Florence Station	Night of 28th to 7 a. m., 29th	2.0
Franklin	Early a. m., 29th	1.0
Hohenwald	Early a. m., 29th	2.0
Jackson	29th	2.0
Lynnville	29th	1.5
Nashville	11.15 p. m., 28th, to 8.40 a. m., 29th	1.5
Nunnally	1 a. m. to 4 a. m., 30th	1.5
Rugby	9 p. m., 28th, to 11 a. m., 29th	2.0
Springdale	2 a. m. to 11 a. m., 29th	2.0
Trenton	Early a. m., 29th	1.5
Tullahoma	1 a. m. to 5 a. m., 29th	3.0
Waynesboro.	28th	1.0
Wier	Night of 28th to 6 a. m., 29th	4.0
<i>Texas.</i>		
Amarillo	7.45 a. m. to 10.05 a. m., 25th	T.
Coldwater	Early a. m., 25th	1.0
Dallas	3 p. m. to 4 p. m., 28th	T.

Stations.	Beginning and ending.	Depth.
<i>Texas—Continued.</i>		
Estella	A few minutes, about 2 p. m., 28th	T.
Gainesville	28th	T.
Hartley	Early a. m. to 9 a. m., 25th	1.0
<i>Virginia.</i>		
Big Stone Gap	4 a. m. to 7 a. m., 25th	1.0
Birdsnest	5.10 a. m., 25th, to 7.05 a. m., 26th	0.2
Hot Springs	7 a. m. to noon, 29th	0.5
Marion	All day, 29th	1.5
Spottsville	Midnight to 5 a. m., 26th	0.5
Stephens City	29th	1.5
<i>West Virginia.</i>		
Bluefield	6.30 a. m., 28th, to 4 p. m., 29th	3.0
Davis	7 a. m., 25th, to 6 a. m., 27th	6.0
Elkhorn	All day, 29th	1.0
Grafton	6 a. m., 25th, to noon, 26th	1.0
Marlington	29th	1.0
New Martinsville	26th	1.8
Pleasant Hill	25th and 26th	5.0
Raleigh	29th	2.0
Tannery	25th and 26th	3.0
Weston	26th and 27th	1.5

DEPTH OF SNOW ON GROUND.

The depth of unmelted snow lying on the ground at 8 p. m. March 31, is shown by the figures on the accompanying chart, No. VI, and also in the accompanying table. Owing to the irregularly scattered distribution of snow at the close of the month, it does not seem proper to attempt to draw lines of equal depth of snow, but the figures given on Chart VI show that 20 inches still lay on the ground on the southwestern shore of Lake Superior; 10 or 15 inches in the interior of Maine; over 30 inches in favorable locations in the mountains of Colorado, Utah, Idaho, northern Nevada, and northern California.

From the weekly series of charts showing the depth of snow lying on the ground on each successive Monday at 8 p. m., notwithstanding the small number of telegraphic reports on which the charts are based, the following summary has been compiled:

March 5.—The southern limit of snow has receded northward by from 700 to 900 miles, and the limit now extends from northern Massachusetts westward to Saugeen, Ont., and from near Alpena, Mich., to Duluth, Minn., thence southwest to Salt Lake City, Utah, and Winnemucca, Nev., thence northward to Portland, Oreg., and Spokane, Wash.; maxima of about 15 inches are reported from Sault Ste. Marie, Mich., and 10 or 12 inches in central and western Maine.

March 12.—During the past week the snow has still further disappeared; 9 inches are reported from Sault Ste. Marie, Mich., and 7 at Marquette, Mich., but less than 2 inches at all other stations.

March 19.—Four inches at Marquette and Sault Ste. Marie, Mich.; only a trace in Maine, but a maximum of 9 inches at Williston, N. Dak., whence an area of 3 inches extends southwestward and an area of 1 inch reaches into Idaho.

March 26.—During the intervening week considerable snow fell, and on the 26th, p. m., there were reported 21 inches at Marquette, Mich., 8 inches at Duluth, Minn., and 4 inches at Sault Ste. Marie, Mich.; the line of no snow on the ground now extends through southern Maine to Lake Ontario, western New York, and Pennsylvania to Parkersburg, W. Va., central Ohio, and central Wisconsin to central Minnesota, and thence southwest into central Colorado and northwestward along the Rocky Mountain Divide.

Snowfall of 10 inches or more, March, 1894, with amounts on ground on the 15th and at the close of the month.

State and station.	Total.	15th.	31st.	State and station.	Total.	15th.	31st.
<i>Arizona.</i>				<i>Arizona—Cont'd.</i>			
Chiricahua Mountain	18.0	Ins.	Ins.	Show Low	17.3	0.0	0.0
Eagle Pass	13.1	.....	.....	Walnut Ranch	21.0	.....	.....
Flagstaff	52.0	.....	.....	Wilgus	11.5	.....	.....
Globe	11.0	0.0	0.0	<i>California.</i>			
Oracle	11.5	0.0	0.0	Cisco	53.0	.....	.....
Saint Helena Ranch	22.0	.....	.....	Deep Creek	18.0	.....	.....

Snowfall of 10 inches or more—Continued.

State and station.	Total.	15th.	31st.	State and station.	Total.	15th.	31st.
California—Cont'd.	<i>Inches.</i>	<i>Ins.</i>	<i>Ins.</i>	Montana—Cont'd.	<i>Inches.</i>	<i>Ins.</i>	<i>Ins.</i>
Edgewood.....	10.0			Great Falls.....	14.6		
Edmonton.....	31.0	61.0	40.0	Hogan.....	6.3	10.0	
Emigrant Gap.....	18.0			Martinsville.....	17.0	3.0	
Girard.....	18.0			Miles City.....	35.2	0.6	0.0
Green Valley.....	21.0			Mingusville.....	17.0	T.	0.6
Julian.....	18.0			Powder River.....	31.0	2.0	
Lick Observatory.....	12.0	0.0	0.0	Red Lodge.....	32.0		10.5
Little Bear Valley.....	21.5			Virginia City.....	11.5		
Little Bear V. (near).....	16.0			Nebraska.			
Lower Holcomb Valley.....	17.5			Fort Robinson.....	13.1	0.0	0.0
Morse House.....	26.0			Hay Springs.....	18.0	0.0	
Shasta Springs.....	20.8			Kennedy.....	12.5	0.0	0.0
Sisson.....	21.0			Kimball.....	11.5		0.0
Squirrel Inn.....	18.0			North Platte.....	13.1	0.0	0.0
Summit.....	34.0			Wallace.....	10.0		
Towles.....	12.0			Whitman.....	13.0		
Truckee.....	22.5			Nevada.			
Tunnel No. 2.....	12.0			Austin.....	24.6	0.0	0.0
Colorado.				Edgewood.....	10.0	25.0	14.0
Boulder.....	14.0	0.0	0.0	Ely.....	42.0	T.	0.0
Box Elder.....	10.2			Eureka.....	15.5	0.0	0.0
Breckenridge.....	15.0	36.0	30.0	Penelon.....	18.0		
Canyon.....	10.0	0.0	0.0	McGill.....	24.0	0.0	0.0
Climax.....	48.1	84.0	72.0	Osceola.....	21.2	0.0	0.0
Collbran.....	17.9		8.5	Palisade.....	12.5	0.0	0.0
Denver.....	10.0	0.0	0.0	Stoffel.....	31.5	13.5	7.0
Downing.....	10.0			Sunnyside.....	11.5	5.0	0.0
Dumont.....	11.0	0.0	0.0	Toano.....	12.7	0.0	0.0
Gold Hill.....	13.8	5.0	2.0	Tybo.....	16.0	T.	T.
Greenhorn.....	31.0			Virginia City.....	15.1		0.0
Manhattan.....	11.0			Wells.....	15.2		
Moraine.....	16.0	0.0	0.0	New Hampshire.			
Pagoda (near).....	10.5	6.0	0.0	Berlin Mills.....	16.5	2.0	0.0
Pikes Peak.....	26.4	0.6	15.0	Bethlehem.....	10.0	4.0	T.
Red Cliff.....	29.5			Lancaster.....	8.5	11.0	5.0
Rico.....	35.2			Littleton.....	12.5		
River Bend.....	10.0			North Conway.....	20.0		
St. Cloud.....	11.0	0.0	0.0	Plymouth.....	9.8	20.0	
Scissors.....	22.0	0.0	3.0	Stratford.....	11.0		4.0
Smoky Hill Mine.....	19.0			West Milan.....	16.5	5.0	5.0
Stamford.....	16.0		3.0	New Mexico.			
Steamboat Spring.....	16.0	24.0	20.0	Chama.....	26.0		2.0
Sunnyside.....	13.2			New York.			
Surface Creek.....	16.0			Baldwinsville.....	10.0	2.0	0.0
Ward District.....	15.3			Le Roy.....	10.0	2.0	0.0
Yuma.....	11.0	T.	0.0	North Dakota.			
Idaho.				Berlin.....	14.8	0.0	4.0
American Hill.....	13.0			Bismarck.....	21.3	0.0	3.0
Atlanta.....	72.0	100.0	78.0	Churchs Ferry.....	16.5		
Garden Valley.....	30.0	49.0	30.0	Dickinson.....	7.4	6.0	12.0
Grangeville.....	22.1			Forman.....	10.5	0.0	0.0
Hailey.....	20.8			Fort Berthold.....	29.8	7.8	1.0
Idaho City.....	29.5	40.0	30.0	Fort Stevenson.....	13.7	1.0	5.0
Lake.....	29.0	38.0	30.0	Fort Yates.....	19.7		0.5
Murray.....	57.0	40.0	30.0	Grafton.....	10.0	0.0	3.0
Oakley.....	17.0			McKinney.....	15.0	9.0	5.0
Paris.....	6.0	10.0		Milton.....	10.0		
Salubria.....	29.0	21.0	9.5	Napoleon.....	12.5		6.0
Soldier.....	24.5	36.0	24.0	Oakdale.....	25.5		6.0
Indiana.				Power.....	12.5	0.0	3.0
South Bend.....	11.0	0.0	0.0	St. Johns.....	21.0	0.0	0.0
Maine.				Wahpeton.....	10.5		
Bar Harbor.....	11.0	1.5	0.0	Washburn.....	11.2	T.	
Calais.....	11.0	7.0	3.0	Wild Rice.....	10.2		2.0
Cornish.....	17.0	18.0	4.0	Ohio.			
Farmington.....	11.8	12.0		Binola.....	20.0	0.0	
Houlton.....	12.0	10.0	4.0	Bissells.....	13.0	0.0	
Indian Stream.....	10.5	20.0	15.0	Elyria.....	15.6		
Lewiston.....	10.0			Hillhouse.....	11.0		
Madison.....	17.0			Wheeler.....	17.0	2.0	2.0
North Bridgton.....	17.0	16.0	10.0	Oregon.			
Michigan.				Beulah.....	13.0	2.0	0.0
Benton Harbor.....	15.1	0.1	0.0	Canyon City.....	19.5	0.0	0.0
Berrien Springs.....	15.5		1.0	Glenora.....	14.9	10.0	4.0
Calumet.....	23.0	24.0	24.0	Hood River (near).....	29.0	4.0	0.0
Cheboygan.....	11.0	2.0	0.0	Joseph.....	23.0	5.0	0.0
Harriaville.....	13.0			Klamath Falls.....	12.0		
Marquette.....	26.5	8.1	5.4	Siskiyou.....	68.0		
Vandalia.....	13.0		0.2	Sparta.....	39.0	36.0	10.0
Minnesota.				Pennsylvania.			
Alexandria.....	12.0		0.0	Confluence.....	2.0	10.0	
Cambridge.....	10.0			Edinboro.....	10.0		2.0
Campbell.....	13.3	0.0	0.0	South Dakota.			
Cromwell.....	11.7	1.6	3.0	Aberdeen.....	14.0	2.0	
Crookston.....	11.0			Ashcroft.....	26.0		8.0
Duluth.....	21.6	5.0	T.	Cross.....	21.8	T.	4.0
Fergus Falls.....	11.8	0.3	0.5	Faultkton.....	23.0		
Fort Ripley.....	10.0			Fort Meade.....	33.7		
Lake Vermillion.....	16.0	7.0	11.0	Fort Sully.....	15.5		
Lake Winnibigoshish.....	18.8	7.0	4.5	Gale.....	12.0	0.0	0.0
Leech Lake.....	17.9	6.0	8.0	Highmore.....	16.0		
Maple Plain.....	11.4	T.	T.	Midland.....	14.0	0.0	0.0
Marfield.....	18.8	8.0	7.0	Oelrichs.....	38.1		
Minneapolis (W. B.).....	11.2	T.	T.	Piedmont.....	34.5	T.	T.
Minneapolis.....	11.1	0.0	0.0	Pierre.....	11.7	0.0	T.
Moorhead.....	15.5	0.0	T.	Rapid City.....	10.5	0.0	T.
New London.....	13.7			Rosebud.....	10.0	0.0	
Park Rapids.....	10.5		T.	Spearfish.....	64.0	1.0	10.0
Pine River.....	12.0	3.0	T.	Webster.....	10.8	0.0	0.0
Pokegama Falls.....	16.7	6.0	9.0	Utah.			
Sandy Lake Dam.....	15.6	0.9	T.	Castle Gate.....	13.5	0.0	0.0
Sunrise City.....	13.5	T.	0.0	Coalville.....	12.0		
Two Harbors.....	23.3	20.0	10.0	Glendale.....	13.5		
Montana.				Grouse Creek.....	10.3	4.1	0.0
Fort Custer.....	14.4			Heber.....	11.5	10.0	0.0
Fort Keogh.....	11.0			Koosharem.....	10.0	T.	0.0
Fort Logan.....	13.0	3.0		Loa.....	10.8		
Glendive.....	21.0			Logan.....	13.0		

Snowfall of 10 inches or more—Continued.

State and station.	Total.	15th.	31st.	State and station.	Total.	15th.	31st.
Utah—Cont'd.	<i>Inches.</i>	<i>Ins.</i>	<i>Ins.</i>	Washington—Cont'd.	<i>Inches.</i>	<i>Ins.</i>	<i>Ins.</i>
Mount Pleasant.....	17.0			Rosalie.....	11.8	0.2	T.
Ogden.....	11.0			Union City.....	25.5	3.0	
Parowan.....	26.5			Wenatchee Lake.....	29.4	49.0	44.0
Provo City.....	11.0			Wisconsin.			
Randolph.....	18.5	4.0		Barron.....	11.5	3.0	0.0
Salt Lake City.....	10.2	0.0	0.0	Bayfield.....	34.0	10.0	20.0
Seofield.....	19.0			Butternut.....	7.0	18.0	20.0
Silver Lake.....	76.0	86.0	90.0	Grantsburg.....	13.0		
Snowville.....	16.0	6.0		Hayward.....	17.0	24.0	T.
Soldier Summit.....	34.0			Wyoming.			
Terrace.....	11.0			Big Horn Ranch.....	34.8	0.0	0.0
Thistle.....	15.0			Fort McKinney.....	15.5		
Vermont.				Fort Washakie.....	20.7		
Irasburg.....	13.0	14.0	T.	Fort Yellowstone.....	22.6		
Stratford.....	12.0	15.0	12.0	La Barge.....	17.0	2.0	0.0
Washington.				Lander (W. B.).....	32.9	0.0	0.0
Elbe.....	24.2	12.0		Lander (V. O.).....	42.0		
Fort Simcoe.....	11.0			Saratoga.....	11.0		
Hunters.....	14.4	20.0		Sheridan.....	25.0	4.0	12.0
Pine Hill.....	22.0	0.0	0.0	Sundance.....	15.0		

HAIL.

Description of the more severe hailstorms of the month is given under "Local storms." Hail was reported as follows: 2d, California, Kansas, Nevada, and Oregon. 3d, California and Texas. 4th, Arizona, Arkansas, California, Kansas, Minnesota, Missouri, Nebraska, Oklahoma, South Dakota, and Texas. 5th, Arizona, California, Indian Territory, Missouri, Oklahoma, and Texas. 6th, Alabama and Illinois. 7th, Illinois, Kentucky, Louisiana, Nevada, Tennessee, and Washington. 8th, Georgia and New York. 9th, California, Illinois, Louisiana, and Nevada. 10th, Arkansas, Michigan, and Texas. 11th, Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, Tennessee, and Washington. 12th, California, Mississippi, and North Carolina. 13th, Michigan, Pennsylvania, Texas, and Washington. 14th, Arkansas, Illinois, Iowa, Massachusetts, Missouri, North Carolina, Tennessee, and Texas. 15th, Alabama, Arkansas, Illinois, Indiana, Iowa, Kansas, Michigan, Mississippi, Missouri, New York, Ohio, Pennsylvania, Tennessee, Texas, and West Virginia. 16th, Arkansas, California, Idaho, Louisiana, Mississippi, Montana, Nevada, Oregon, Texas, and Washington. 17th, Alabama, Arkansas, Indian Territory, Kansas, Kentucky, Michigan, Minnesota, Mississippi, Missouri, Nevada, North Carolina, Oklahoma, South Carolina, Texas, and Wisconsin. 18th, Arkansas, California, Idaho, Indian Territory, Louisiana, Michigan, Minnesota, Mississippi, New Mexico, Oklahoma, Texas, Washington, and Wisconsin. 19th, Alabama, Arkansas, California, Louisiana, and Texas. 20th, California, Georgia, Kentucky, Louisiana, Mississippi, and Ohio. 21st, Illinois, Maine, Michigan, Minnesota, Mississippi, Nebraska, New York, Tennessee, and Wisconsin. 22d, Illinois, Indiana, Kentucky, Louisiana, Maryland, Michigan, Mississippi, Missouri, Nebraska, New York, Ohio, Tennessee, and Texas. 23d, Delaware, New York, and Tennessee. 24th, Connecticut and Louisiana. 25th, Tennessee. 28th, Tennessee. 29th, Idaho, North Carolina, and Tennessee. 30th, Montana. 31st, Colorado, Louisiana, and Utah.

SLEET.

Description of the more severe sleetstorms of the month is given under "Local storms." Sleet was reported as follows: 1st, Colorado, Nevada, and Washington. 2d, California, Nevada, Oregon, Pennsylvania, Washington. 3d, Arizona, California, Nevada, New Mexico, Oregon, and Utah. 4th, Arizona, California, Colorado, Minnesota, Nebraska, New Mexico, North Dakota, South Dakota, and Washington. 5th, Iowa, Minnesota, Nevada, Oregon, Washington, and Wisconsin. 6th, Michigan, Nevada, and Pennsylvania. 7th, California, Idaho, Nevada, Ohio, and Washington. 8th, Minnesota, New York, Ohio, Oregon, Pennsylvania, Washington, and Wisconsin. 9th, California, Massachusetts, Montana, Nevada, Utah, and Washington. 10th, Iowa, Minnesota,

South Dakota, and Wisconsin. 11th, Utah and Washington. 13th, New York and Washington. 14th, Illinois, Iowa, Minnesota, North Dakota, Ohio, Oregon, and Wisconsin. 15th, Illinois, Michigan, New Jersey, North Dakota, Ohio, Pennsylvania, Washington, and Wisconsin. 16th, Arizona, California, Nevada, Oregon, Utah, and Washington. 17th, Arizona, New Mexico, Oregon, and Utah. 18th, Arizona, California, Kansas, Nevada, Oregon, and Washington. 19th, Arizona, California, Nevada, North Dakota, Oregon, South Dakota, and Utah. 20th, Arizona, California, Colorado, Minnesota, Nebraska, Nevada, North Dakota, and South Dakota. 21st, Arizona, Maine, Michigan, Minnesota, Nebraska, Nevada, New Mexico, South Dakota, Vermont, and Wisconsin. 22d, Iowa, Massachusetts, Michigan, Minnesota, New York, Ohio, Pennsylvania, Vermont, West Virginia, and Wisconsin. 23d, Maine, Massachusetts, Michigan, Minnesota, New Hampshire, North Dakota, Vermont, and West Virginia. 24th, Michigan and New York. 25th, New Hampshire, Ohio, and Tennessee. 26th, Kentucky and New York. 27th, Alabama and Nebraska. 28th, Arkansas, Illinois, Indiana, Kentucky, Louisiana, Mississippi, Missouri, South Carolina, and Tennessee. 29th, Connecticut, Michigan, Mississippi, Montana, New Jersey, North Carolina, South Carolina, Virginia, and Wisconsin. 31st, Arizona, Colorado, Minnesota, New Mexico, and Wisconsin.

WET AND DRY PERIODS IN RELATION TO AGRICULTURE.

The Weather Crop Bulletin for the month of March shows that the precipitation was unusually small over all sections east of the Mississippi, and that the month was also very dry in California, but heavy rainfall occurred in northeast Texas, Arkansas, and on the Gulf coast of Louisiana, Mississippi, and Alabama, and also on the coast of Oregon and Washington. As regards rain and snow in relation to agriculture, the following notes are taken from this bulletin, as also from the monthly reports of the State weather services and other sources:

Arkansas.—Late heavy rains have delayed farm work.
Arizona.—Great excess of precipitation; grass ranges and live stock in fine condition; farming operations well advanced.
California.—The northern portion needs rain, but the rest of the State much more so; outdoor work is backward for the lack of rain; grain crop will be short unless spring showers soon come.
Colorado.—Frequent snows favorable for spring work; total snowfall on southern mountains 9 feet, or 2 feet more than last year; grass getting green.
Florida.—Heavy rains delayed planting in the western portion; elsewhere the season is earlier than usual.
Georgia.—Farm work delayed by much rain in the southern portion.

Idaho.—Snow is disappearing rapidly; season opens earlier than usual; little or no farm work done as yet, except in the western sections.

Illinois.—Conditions unusually favorable for farm work up to the 24th.

Indiana.—Wheat wintered well and is far advanced.

Iowa.—During the first twenty days abundant moisture; seeding and plowing far advanced; winter wheat and some spring cereals considerably injured by the weather of the last decade.

Kansas.—Unusually warm and dry; dry weather makes the wheat backward.

Kentucky.—Up to the 25th deficient precipitation and excessive temperature set all crops, vegetation, and farm work three weeks ahead.

Louisiana.—Heavy rains delayed planting.

Minnesota.—Precipitation in excess, especially in the latter half of the month; ground is generally frozen, but soil is gradually getting in good condition; stock wintered well; bees are in better condition than for several years.

Mississippi.—The heavy rains have delayed the season.

Missouri.—Weather unusually favorable up to the 22d.

Montana.—More than the usual amount of precipitation; the snow has but recently melted and farming is not yet begun.

Nebraska.—The first twenty days exceptionally fine and farm work advanced well; winter wheat looks well.

New Mexico.—Weather favorable for farm work; feed abundant; range stock in excellent condition.

New York.—The season is early; soil is in fine condition; grass and grain wintered finely; good maple sugar season.

North Carolina.—The season was forced ahead by the fine weather up to the 26th, when the freeze caused enormous damage.

North Dakota.—Ground covered with snow; very little seeding before the 20th and nothing since.

Ohio.—Weather conditions favorable until the recent cold.

Oklahoma.—Fine weather and abundant rain up to the 24th, when cold and frost set everything back.

Pennsylvania.—First three weeks of fine weather; the cold of last week did little damage; season unusually early; the dryness and slow moderation of the weather greatly in favor of all crops.

South Carolina.—Up to the 24th the abundant moisture in the soil and the midsummer heat advanced the season by two weeks; owing to the frost, replanting will be necessary.

South Dakota.—Precipitation considerably above normal; season unusually early; no material damage by the cold weather of the last week; ample moisture in the ground.

Tennessee.—Precipitation below the normal; up to 23d season two weeks in advance; cold wave of the 26th did great damage.

Texas.—Up to the 20th the season was two weeks earlier than the average, but as a result of the frost is now two or three weeks late.

Vermont.—Month unusually warm and dry, unfavorable for maple sugar.

Virginia.—Until the recent freeze farming was unusually advanced.

Washington.—Rainfall above normal; vegetation backward, but earlier than last year.

West Virginia.—Precipitation below average; vegetation well advanced until the hard freeze and frosts of the 26th and 28th; light snow afforded some protection to the wheat and oats; grass in good condition.

Wisconsin.—Winter grain in fair condition; very little farm work done as yet.

Utah.—Precipitation below the normal, but the large amount of snow in the mountains will give good supply for irrigation for the ensuing season; the spring is backward; Utah escaped the frosts of the close of March.

WIND.

PREVAILING WINDS.

The prevailing winds for March, 1894, viz, those that were recorded most frequently at Weather Bureau stations, are shown in Table I, but are not given on Chart II, as has hitherto been the custom. The summary of State Weather Service reports gives the prevailing winds recorded at voluntary stations in the respective States; these may be summarized as follows:

South.—Alabama, Arkansas, Georgia, Idaho, Illinois, Iowa, Kansas, Louisiana, New York, Oklahoma, Tennessee, Texas.

Southwest.—Arizona, Delaware, Indiana, Kentucky, Michigan, Missouri, Montana, Nevada, New England, North Carolina, Ohio, Oregon, South Carolina, Utah, Virginia, Washington, Wisconsin.

West.—California, Colorado, Maryland, West Virginia, Pennsylvania, Wyoming.

Northwest.—Minnesota, Nebraska, New Jersey, North Dakota, South Dakota.

North.—None.

Northeast.—None.

East.—Florida.

Southeast.—None.

RESULTANT WINDS.

The resultants for the current month, as deduced from the hourly records of winds, by self-registers at about 67 regular Weather Bureau stations, are given in Table VIII. Other resultants, deduced from the personal observations made at 8 a. m. and 8 p. m. at all stations that appear on the morning and evening maps of the Weather Bureau, are given in Table IX. These latter resultants are also shown graphically on Chart II, in connection with the isobars based on the same system of simultaneous observation; the small figure attached to each arrow shows the number of hours that this resultant prevailed, assuming each of the morning and evening observations to represent one hour's duration of a wind of average velocity; these figures (or the ratio between them and the

total number of observations in this month) will indicate the extent to which winds from different directions counter-balance each other. The original north, south, east, and west components, on which these resultants are based, are given in detail in Table IX for convenience in making further studies.

During March the resultant movement from the northwest prevailed over North Dakota, South Dakota, and Nebraska; the movement from the southwest prevailed over Washington, Oregon, northern California, the upper Mississippi Valley, the Lake region, the Ohio Valley, New England, and the south Atlantic States; the movement was from the southeast in Florida and the Gulf States.

HIGH WINDS.

Wind velocities of 50 miles, or more, per hour were reported at regular stations of the Weather Bureau as follows (maximum velocities are averages for 5 minutes; extreme velocities are gusts of shorter duration):

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
		Miles.				Miles.	
Amarillo, Tex.	23	52	s.	Havre, Mont.	14	53	nw.
Do.	23	56	sw.	Huron, S. Dak.	14	56	se.
Do.	23	56	s.	Do.	21	52	se.
Do.	23	56	n.	Keeler, Cal.	17	56	nw.
Bismarck, N. Dak.	23	53	nw.	Lander, Wyo.	16	60	sw.
Chicago, Ill.	10	61	nw.	Milwaukee, Wis.	11	56	w.
Do.	11	60	sw.	Moorhead, Minn.	24	56	nw.
Do.	28	54	se.	Pikes Peak, Colo.	3	92	sw.
Colorado Springs, Colo.	10	66	nw.	Do.	9	91	w.
Davenport, Iowa.	10	60	sw.	Do.	11	91	w.
El Paso, Tex.	17	52	nw.	Do.	30	93	w.
Fort Canby, Wash.	1	52	s.	Port Huron, Mich.	24	54	w.
Do.	2	58	s.	Rapid City, S. Dak.	22	51	n.
Do.	8	84	s.	Saint Vincent, Minn.	23	50	n.
Do.	10	79	s.	Sault Ste. Marie, Mich.	11	50	nw.
Do.	13	54	s.	Shreveport, La.	18	54	nw.
Do.	14	79	se.	Tatoosh Island, Wash.	7	50	w.
Do.	15	54	se.	Tucson, Ariz.	11	51	w.
Do.	17	60	s.	Winnemucca, Nev.	9	58	sw.
Do.	18	72	s.	Do.	16	56	sw.
Do.	28	55	se.	Yuma, Ariz.	17	54	nw.
Hatteras, N. C.	29	52	nw.	Do.	19	53	nw.

LOCAL STORMS.

4th.—At Abilene, Tex., high wind in the evening caused minor damage. A severe local storm of short duration and moving northeast passed over Rich Hill, Bates County, Mo., at night. The wind blew in heavy gusts attended by heavy rain and small hail. The clouds had a whirling motion and were attended by a continued noise like the rushing of a railroad train. Not much damage was done at this point, but in the surrounding country the loss amounted to several thousands of dollars. Several persons were killed and others injured 7 miles north of Rich Hill. At Sedan, Kans., a windstorm destroyed outbuildings and damaged farm houses. During a thunderstorm in Woodson County, Kans., stock was killed by lightning. Slight damage was done by a thunder and wind storm at Ashton, Nebr.

6th.—At Sandyville, W. Va., a heavy windstorm did considerable damage to fences. A windstorm, moving from the northwest, in a path 15 feet wide by 100 feet long, passed over Pueblo, Colo., at 5.50 p. m. The storm passed between several buildings at the steel works, turned to the east, describing a small circle around several low buildings. Smokestacks, 45 feet high, on the steel works building were blown down.

8th.—Small buildings were blown down and other damage was done by a windstorm at Le Roy, Colo.

10th.—A thunder and rain storm, accompanied by hail and high wind, occurred at Corsicana, Tex.; buildings were blown down. At Chicago, Ill., a windstorm in the early morning reached a maximum velocity of 61 miles per hour from the northwest. A man was killed by a falling cornice, and

several houses were partially blown down. A severe windstorm at night uprooted trees and did other damage at Manitowoc, Wis. At Sheboygan, Wis., a wind and rain storm moved southeast, doing minor damage.

11th.—A rain and wind storm, with heavy hail and thunder, occurred at Maple Grove, Ala., at 3.30 p. m.; trees and fences were blown down. At Sault Ste. Marie, Mich., a southwest windstorm reached a maximum velocity of 50 miles per hour; a barn was blown down and a horse killed.

13th.—During a thunderstorm at Damascus, Ala., 2 persons were killed by lightning.

14th.—A severe thunderstorm, moving northwest, passed over Fort Smith, Ark., between 3 and 6.30 a. m. Hailstones as large as pigeon eggs fell for twenty minutes; considerable damage was done to flowers and hothouses.

15th.—A thunderstorm, with heavy hail, occurred at Somers, Pa.; a barn was struck by lightning. A thunderstorm, with high wind, began at Chattanooga, Tenn., at 7.45 p. m.; damage was done to electric wires. At Cardington, Ohio, a severe thunderstorm occurred in the early morning; a barn was struck by lightning and stock killed. A thunderstorm passed over Cincinnati, Ohio, from 5.45 to 8.30 a. m.; hail fell for a few minutes; damage was done by lightning. During a thunderstorm, in the early morning, at Kilbourne, Ohio, damage was done by lightning. At Winona, Mo., a thunderstorm occurred in the early morning; a man was killed by lightning. A house was struck by lightning at Sedalia, Mo. A report from Salubria, Idaho, states that heavy rain in the mountains caused the Weiser River to overflow its banks, and by the morning of the 16th adjoining lands were covered with water to a depth of 5 feet. Damage was done to property and travel delayed.

16th.—A violent storm, with heavy rain and hail passed over Santa Anna, Tex.; a funnel-shaped cloud, and what resembled a ball of fire, was observed. Five persons were killed and property to the estimated value of \$10,000 was destroyed.

17th.—A heavy rainstorm of short duration, attended by thunder, lightning, and hail, did considerable damage at Bear Lake, Mich., about 2 p. m.; a few miles south a man was struck and two cows were killed by lightning. During a thunderstorm at Evart, Mich., considerable damage was done by lightning. In the evening severe local storms occurred in Texas. A tornado passed over Emory, Tex., in a path 300 yards wide, at 7.20 p. m.; heavy rain fell, accompanied by incessant thunder and lightning; four persons were killed and property valued at \$25,000 was destroyed. At Celeste, Tex., a storm moving northeast, followed by heavy rain, occurred at 8 p. m. A child was killed and damage was done to property. A severe storm, moving northeast, with a funnel-shaped cloud, passed over Corsicana, Tex., at 7 p. m.; in this county seven houses were destroyed. At Jacksonville, Tex., a funnel-shaped cloud moved northeast in a path 300 yards wide about 11 p. m.; damage, \$600. At Rice, Tex., a storm with a funnel-shaped cloud moved northeast, attended by vivid lightning, heavy thunder, and large hail; ten houses were destroyed. At Yuma, Ariz., a wind storm reached a maximum velocity of 54 miles per hour at 4.38 a. m., being the highest velocity ever recorded at that station. Minor damage was done at Fort Yuma.

18th.—At Camden, Ark., a heavy rain and wind storm, with thunder and lightning, began in the afternoon and continued into the night; damage was done by rain. During a thunderstorm at Morrilton, Ark., damage was done to property. At Prescott, Ark., a storm of heavy rain and small hail occurred at 5 p. m.; damage was done to fences and crops. At Martinville, Ark., a thunderstorm, with heavy rain and small hail, moved northeast at 2 a. m.; damage was done to buildings. A report from Lansing, Tex., states that

a violent storm moved northeast between that place and Hallsville at 1.30 a. m., attended by heavy thunder and hail and followed by heavy rain; eight persons were killed, and the damage to property was estimated at \$1,500. The storm occurred at Longview, Tex., about 1 a. m.; a funnel-shaped cloud was observed; heavy hail fell and the thunder and lightning was continuous; damage, \$2,000. At Lufkin, Angelina Co., Tex., a severe storm moved northeast, with thunder, lightning, and rain; it passed through the county in a path about 1 mile wide and 25 miles long; several persons were seriously injured, and considerable damage was done to timber. A storm, with a funnel-shaped cloud and having a whirling motion, moved northeast over Holland, Tex., about 4 p. m.; damage, \$1,000.

19th.—A severe thunder and wind storm occurred at Helena, Ark., at 4.30 p. m.; a funnel-shaped cloud was observed; damage was done to the extent of \$25,000. A storm moved northeast near Lufkin, Tex., about 9 a. m.; it passed 12 miles through the county in a path 50 yards wide; a funnel-shaped cloud, with a whirling motion, was observed; very heavy rain, thunder, and lightning continued all day after the storm; damage to buildings, \$5,000. A storm moving north over Nacogdoches, Tex., about 7 a. m., caused damage to the extent of \$1,000. A severe storm, with a funnel-shaped cloud, moving northeast, passed over the vicinity of Leonard, Tex., at 8 p. m.; heavy rain and large hail fell, and the thunder and lightning was continuous; an infant was killed and a house destroyed. A storm struck Bartlett, Williamson Co., Tex., about 3 a. m.; 2 churches and number of buildings were destroyed. The heaviest rain-storm in years prevailed in the vicinity of Denison, Tex.; all streams overflowed and great damage was done to bridges and farms.

20th.—At New Orleans, La., during a high wind and thunder storm, damage was caused to the extent of \$5,000. A destructive storm passed over the north part of De Soto Parish, La., killing 1 person and destroying several houses. A violent windstorm occurred at Purvis, Miss., at 5 a. m.; damage was done to timber and outhouses and some stock killed. A heavy storm of wind and rain, attended by thunder and lightning, struck Natchez, Miss., shortly after midnight, causing minor damage. A storm of wind and rain visited the vicinity of Lumberton, Miss., during the early morning;

damage was done to fences and trees. High wind in the early morning caused minor damage at Little Rock, Ark.

21st.—During a heavy thunderstorm at Millville, N. J., 1 person was killed and another stunned by lightning. A severe thunderstorm occurred in the west part of Pittsylvania County, Va.; 1 person was stunned by lightning and a house damaged. A thunderstorm occurred at night at Houston, Mo.; a child was struck by lightning. Heavy snow and wind storms prevailed over North Dakota, South Dakota, Nebraska, and Minnesota; in some instances these began on the 19th and continued until the 22d. At Duluth, Minn., a sleet, rain, and wind storm prevailed on the 21st, changing to a heavy snow-storm on the 22d; damage was done to electric wires and trees by the accumulation of heavy ice, and street car traffic was delayed. At Valentine, Nebr., a storm of snow and high wind began at 11 a. m., and continued until the morning of the 22d. The snow drifted badly, delaying railroad traffic and causing loss of stock. At Bismarck, N. Dak., a storm of snow and wind began at 9.40 p. m., 19th, and prevailed until the 21st; all traffic was delayed. The most severe snow and wind storm since March, 1888, began at Rapid City, S. Dak., at 3.10 p. m., and continued during the 22d. All trains were blockaded, business suspended, and the loss of stock was heavy.

22d.—During a thunderstorm at Langley, Va., a barn was struck by lightning and 3 horses were killed. A report from Louisville, Ky., states that severe local storms occurred in Kentucky, along the Ohio River, in the morning. At Owensboro, Ky., a storm, possessing some of the characteristics of a tornado, occurred at 6 a. m.; valuable stock was killed and damage was done to property. A violent downpour of hail occurred at New Albany, Ind., at 6 a. m.; much damage was done. During a thunderstorm in the early morning at St. Louis, Mo., damage was done by lightning to the extent of \$33,000.

23d.—A severe thunder and wind storm passed over Bridgeton, N. J., in a path 100 to 200 feet wide, at 1.30 a. m.; houses and barns were destroyed. During a storm at Washington, N. C., 4 boats were capsized and 2 persons drowned. At Fargo and Fort Berthold, N. Dak., severe snow and wind storms caused loss of stock and damage to property.

24th.—At Crookston, Minn., a windstorm at night caused damage to roofs and electric wires.

ATMOSPHERIC ELECTRICITY.

GENERAL STATISTICS.

The table on page 120 shows in detail for March, 1894, the number of stations from which meteorological reports were received, and the number of such stations reporting thunderstorms (T) and auroras (A) in each State and on each day of the month.

THUNDERSTORMS.

A mention of the more severe thunderstorms reported during the month is given under "Local storms." The dates on which reports of thunderstorms were most numerous were: 4th (188), 14th (106), 15th (243), 17th (133), 18th (166), 22d (190). The States from which the most numerous reports were received were: Louisiana, 143; Missouri, 121; North Carolina, 102; Ohio, 163.

AURORAS.

The evenings on which bright moonlight must have interfered with observations of faint auroras are assumed to be those of the four days preceding and following the date of full moon, viz, from the 17th to 25th, inclusive. On the remaining twenty-two days of the month 782 reports were re-

ceived, or an average of thirty-six per day. The dates on which reports of auroras were especially numerous were: 2d (24), 8th (45), 30th (629), 31st (35); on the 23d, notwithstanding the moonlight, 16 reports were received, mostly from Minnesota, Michigan, Montana, New York, North Dakota, South Dakota, Wisconsin, and, after making a general allowance for moonlight, it seems proper to include the 23d among the dates of frequent auroras.

The aurora of the evening of the 30th was remarkable in several respects. It was visible at 629 stations in the United States, and the few reports that have been published from Canada and Europe show that we can not yet indicate, even approximately, the limits of the area over which it was observed. Its southern limit in the United States is indicated by its visibility at one, two, or three stations in Georgia, Alabama, Mississippi, Arkansas, Kansas, Colorado, Utah, Nevada, Oregon, and Washington. Notwithstanding the fact that many of our third order stations pay no special attention to the reporting of auroras, yet 50 per cent, or more, of the stations in Virginia, Tennessee, Kentucky, Illinois, Michigan, Indiana, Ohio, Pennsylvania, Maryland, Delaware, New

Thunderstorms and auroras, March, 1894.

States.	No. of stations.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.	Total.			
Alabama.....	52	T.					1	1	2	1		4	1		1	5	7	2			5			1	1	1							33	T.		
Arizona.....	53	T.		1													1	3															5	T.		
Arkansas.....	46	T.			2	8		1			4	3		1	7	9	5	7	13	11	5	5	5				1				1	1	89	T.		
Colorado.....	79	T.		1	1					1	1								4													1	9	T.		
California.....	316	T.		1						1	1							1														6	2	T.		
Connecticut.....	25	T.		4																2				1								15	19	T.		
Delaware.....	4	T.			1		1									1				2		2	2								4	7	T.			
District of Columbia.....	4	T.																				1	1	1								1	3	T.		
Florida.....	36	T.		2				1	1	2	1	1	7	1					1	1	1			1	4	11	4	1					41	0	T.	
Georgia.....	52	T.						6	1	2		15	3		3	2	5	1		1	7			5	2	3			1		2		59	1	T.	
Idaho.....	22	T.		1										1																		7	2	T.		
Illinois.....	59	T.			6	2		5		1	1	1			11	14	1	1	12	2		3	8									1	69	0	T.	
Indiana.....	45	T.						7							1	16			7	3	5		14									20	53	T.		
Indian Territory.....	7	T.			1	1								1		1		2														6	24	T.		
Iowa.....	75	T.			26	1	1				2		1		25	3		1	16	2		1						2				81	0	T.		
Kansas.....	81	T.		1	29			1			1				3	1		13	2	1												2	52	T.		
Kentucky.....	40	T.						2						2		10	1	4	9		4	1	11									22	44	T.		
Louisiana.....	53	T.			2	8	2	7	1	12		3	1		4	20	13	7	19	4	3	12	1	13	2			4	4			143	0	T.		
Maine.....	19	T.																1														13	18	T.		
Maryland.....	24	T.		1					3			2	4			1	1			2	1	7	10	7								15	36	T.		
Massachusetts.....	84	T.																							1	1	1					45	5	67	0	T.
Michigan.....	79	T.		1	12	1						2		1		1	1		7	19	2	2	1	1								31	43	T.		
Minnesota.....	78	T.			38	4	1				1				3			8	3		11	3										73	33	T.		
Mississippi.....	43	T.			1			1	15	1						1	12	13	5	5	6	10	1	10	1							15	53	T.		
Missouri.....	96	T.			22	17	1	1			1				9	21		6	19	2	5	6	8									3	121	0	T.	
Montana.....	20	T.																															1	7	T.	
Nebraska.....	69	T.			23	1												4			2	1	1									5	32	T.		
Nevada.....	46	T.													1	1		6														1	8	T.		
New Hampshire.....	29	T.																															2	4	T.	
New Jersey.....	57	T.		3		2			4																								14	24	T.	
New Mexico.....	29	T.		1																													38	41	T.	
New York.....	81	T.																															1	3	0	T.
North Carolina.....	56	T.		1					7						1				3			7											48	14	T.	
North Dakota.....	33	T.				3																											22	22	T.	
Ohio.....	135	T.		1	1			2	2		6	1	1		1	1				2	3	6	26	7	46	2						1	163	0	T.	
Oklahoma.....	18	T.			1	8	1											4	4														82	18	T.	
Oregon.....	70	T.																																0	0	T.
Pennsylvania.....	88	T.		1											4	2	15						17	4									40	45	T.	
Rhode Island.....	9	T.																																7	7	T.
South Carolina.....	43	T.						3		7	2	10	1		11	6	4	10	3	1	3	3											15	64	T.	
South Dakota.....	39	T.				6																												8	15	T.
Tennessee.....	43	T.		1					3		1		13			11	14		2	9	7	6		6	6							20	77	T.		
Texas.....	68	T.		3	1	5	3	1	3	2	1	2	2		1	4	3	3	8	5	6	2		3	1								60	0	T.	
Utah.....	36	T.																																7	7	T.
Vermont.....	13	T.																																3	3	T.
Virginia.....	39	T.										3	3			4	1		2	1	2	8	7	1									32	21	T.	
Washington.....	46	T.																																2	2	T.
West Virginia.....	36	T.														19							4	12	1								16	36	T.	
Wisconsin.....	62	T.				12					6				7	3	2	7	13		2	3	2											58	16	T.
Wyoming.....	14	T.																																27	0	T.
Sums.....	2,633	T.		2	13	6	188	51	10	42	10	39	27	75	30	21	106	243	84	133	166	78	94	93	190	54	21	19	5	5	6	9	7	8	1835	T.
		A.		6	24	3	3	2	2	4	45	3	2	0	3	1	2	2	2	1	0	0	1	4	16	4	1	3	2	4	5	629	35	809	A.	

Jersey, New York, Connecticut, Rhode Island, Massachusetts, Vermont, New Hampshire, and Maine report the existence of a remarkably fine display of aurora, beginning in the early evening. This aurora, both in America and Europe, was intimately associated with two areas of high pressure that had pushed further south than usual; in the United States high area No. XVIII had moved south and east over the Gulf States and was, on the evening of the 30th, central off the south Atlantic coast; in Europe a great area of high pressure had pursued an almost parallel course southward over the North Sea and eastward toward the Black Sea, where it was central on the evening of the 30th; pressure was decidedly above the normal over the central North Atlantic Ocean between the 30th and 50th parallels as well as over western Europe and eastern North America; the only important depression was developing in the neighborhood of Newfoundland. The auroral light was first observed in Great Britain about 10 p. m. of the 30th, Greenwich time (which is simultaneous with 5 p. m. of the 75th meridian, or the standard time of the Atlantic States and of the Weather Bureau), but the electric disturbance, as shown by its effects on the magnetic needle at Washington, had already begun at 6 a. m. of the 30th, at which time also heavy frosts and freezing weather were prevailing from Washington southward to Georgia. Thus, the American display of the 30th took place principally over the region where cold air prevailed at the surface of the ground, while an upper current had apparently started to flow rapidly toward the northwest and north in its circulation around low area No. XXI, which was then central in Manitoba. Similar conditions prevailed in Europe, where the auroral light also appeared, principally on the northwest border of a region of high pressure, from which cold air was flowing into a low pressure over the Atlantic; these are the normal atmospheric conditions under which extensive auroras generally appear, but in this case they were transferred further south than usual. In the extreme north there is a large polar region where the auroral light is always observed to the south and rarely or never in the zenith or the north, thus showing that the atmospheric conditions favorable to auroras and which brought about the present display so far south in the United States must be comparable with those that generally prevail in this northern zone of greatest auroral frequency. The general displacement of the magnetic curves, which, as before said, began at about 6 a. m. at Washington, was followed by rapid alternations at 3 p. m., which reached their maximum at about 8.40 p. m., and had ceased by 2 a. m. of the 31st. We have no knowledge at present as to the connection between the different phases of magnetic disturbance and the appearance of the auroral light, but it is a plausible hypothesis that the gradual displacement between 6 a. m. and 3 p. m. represents an increasing electric strain, while the rapid alternations between 3 p. m. and 2 a. m. represent the effect of rapid discharges and the resulting restoration of the previous state of equilibrium. From this point of view we should expect the auroral light to have first appeared in the central region, where the discharges occurred at 3 p. m., and this conclusion accords with the fact that in the region where the present aurora was most brilliant, viz, from Washington, D. C., to Boston, Mass., and especially at coast stations, such as Boston and Nantucket, Mass., and Cape May, N. J., the auroral light was noticed as soon as the twilight had progressed sufficiently to bring out its fainter light by contrast; in fact, at Block Island, R. I., the observer's record begins with sunset, and several stations report it as having begun within forty minutes after sunset.

As we proceed from this central region northeast, northwest, or southwest toward the interior the interval between sunset and the beginning of the aurora increases, but quite irregularly; it amounts on an average to one hour and twenty

minutes for Lake Erie and Lake Ontario, one hour and twenty-five minutes for South Carolina, and one hour and forty minutes for Maine; on the other hand the interval was apparently only forty-five minutes at La Crosse, Wis., and Dubuque and Davenport, Iowa, and fifty minutes in Tennessee and Kentucky, so that the irregular region of earliest appearance after sunset may be said to have extended from Block Island, R. I., and Marthas Vineyard, Mass., to Cape Hatteras, N. C., and thence westward over Maryland into Tennessee and Kentucky.

The beginning of the auroral light in England at 10 p. m., Greenwich, or 5 p. m. eastern or standard time, and therefore two or three hours earlier than as seen along our coast, should be considered, not in reference to absolute direction in space, but rather in reference to the time of sunset. In five hours after the Greenwich meridian assumes a certain position in space the diurnal rotation of the earth will bring the seventy-fifth meridian into that same position; this is true for all seasons of the year, and if auroras depend upon absolute position there should, therefore, be a difference of five hours in the absolute time of their occurrence on these two meridians. If, on the other hand, the aurora depends upon the condition of the moisture of the atmosphere, then the time elapsed since sunset and the general climatic conditions would be appreciable factors. In the present case the aurora appeared in Great Britain long after sunset, viz, from three to four hours, so that the central region of the disturbance and of the conditions most favorable for auroras was evidently far from that country.

If each observer could be sure that he was looking at the same spot of light as his neighbor to the north or south of him, he might determine, approximately, the height of the auroral light by the consideration that our most southern observers saw it to the north at an altitude of 10° , 20° , or 30° , while our most northern observers saw it to the south at an altitude of 50° , 60° or 70° ; from such considerations as these the reports of observers 500 miles apart can be construed as demonstrating an altitude of from 100 to 300 miles; but such a computation rests upon the wholly indefensible hypothesis that distant individuals are observing the same spot, whereas the best observers, beginning with Bravais and Lottin in 1838, have repeatedly demonstrated that persons distant but 5 or 10 miles from each other do not see the same spot.

The auroral light of March 30 must be looked upon as a thin sheet at a low altitude which spread gradually over the surface of the country from our middle Atlantic coast north, west, and south as rapidly as the atmospheric moisture came into a condition proper to convert the electric discharge into the auroral light. From this point of view, we more clearly understand the phenomena called the "merry dancers," which consist of spots or waves of light moving rapidly from the horizon up toward the zenith and rarely occupying more than two seconds in this movement; even observers a few miles apart describe them as visible simultaneously all around the horizon; they usually begin at some small altitude, say 10° above the horizon, and disappear when they come within 10° of the zenith; when low down they are like little clouds or patches of light, but before they disappear near the zenith they have become smaller. It must be apparent that if several observers simultaneously see such phenomena as these, then we have here to do with an optical illusion which is easily explained by the laws of perspective; these patches of light are not moving from all directions horizontally toward each observer's zenith, but, on the contrary, they start from points near the horizon in the immediate neighborhood and move upward along lines that are all parallel to the free dipping needle; therefore, they all apparently converge by perspective toward the so-called magnetic zenith

precisely as do the stationary beams of light that generally precede the appearance of the "merry dancers." The points at which these fleeting clouds begin and end their upward movement represent the bottom and top of the layer within which the whole auroral display is going on, and probably the same may be said as to the lower and upper ends of the brilliant, definite, and long enduring beams of light generally called "streamers." These rapidly moving flashes of light, like ordinary lightning, appear to represent electric discharges between the earth or lower atmosphere and the upper atmosphere, and it is during their continuance that the magnetic needles are most violently disturbed, as though, at that time, the discharges were taking place nearest to the station, or as though they required most violent fluctuations in the local potential, or difference of potential, in order to produce them. In this connection the reader should study the diagram given on Chart VIII.

EARTH CURRENTS AND MAGNETIC STORMS.

Disturbances on the telegraph lines were reported at a few stations in this country on the 30th in Ohio, Wisconsin, and between Boston, Mass., and Buffalo, N. Y., at 5.30 p. m., increasing until at 7 p. m. the trouble had become general and

a wire from Boston, Mass., to Manchester, N. H., was run by the earth current alone; the line from Boston, Mass., to St. John, N. B., also showed much disturbance. The noises on government telephone lines in Great Britain were especially studied by the General Superintendent, Mr. Preece.

By the kindness of the Superintendent of the U. S. Naval Observatory it becomes possible to give on Chart VIII a facsimile of the curves of the self-registering magnetic declination, horizontal force, and vertical force during the 29th and 30th, from which it will be seen that the disturbances of the magnetic needle were unusually large and violent.

BALL LIGHTNING.

Dr. Howard Shriver, of Cumberland, Md., reports, with reference to an electric storm on March 21, that a lightning flash struck nearly two miles southwest of the town, and the same crash seems to have also reached close to the town where the lightning and thunder were not more than one and one-half seconds apart.

A Mrs. Brackett, while standing at her window, saw a "ball of fire" about as big as your two fists pass rapidly (apparently along outside of the window pane), ending in an explosion like a gun. The explosion was heard by others in the house. The electric wires were so injured as to need repair in this part of the house only.

STATE WEATHER SERVICES.

[Temperature in degrees Fahrenheit; precipitation, including melted snow, in inches and hundredths.]

The following extracts and summaries are republished from reports for March, 1894, of the directors of the state weather services. The Maryland service includes Delaware and the District of Columbia. The New England service includes the six New England States. The organization of a service for Alaska, under the director of the California State service, is contemplated.

ALABAMA.

Temperature.—The mean was 4.5 above the normal; maximum, 88, at Tuscaloosa, 19th; minimum, 15, at Newburg, 27th; greatest monthly range, 70, at Newburg; least monthly range, 49, at Opelika.

Precipitation.—The average was 1.04 below the normal; greatest monthly, 11.51, at Mobile; least monthly, 1.31, at Sturdevant.

Wind.—Prevailing direction, south.—F. P. Chaffee, Local Forecast Official, Weather Bureau, Montgomery, director.

ARIZONA.

Temperature.—The mean was 2.0 below the normal; maximum, 96, at Palomas, 28th; minimum, —9, at Whipple Barracks, 5th; greatest monthly range, 88, at Whipple Barracks; least monthly range, 49, at Peoria.

Precipitation.—The average was normal; greatest monthly, 5.20, at Flagstaff; least monthly, 0.00, at Walnut Grove.

Wind.—Prevailing direction, southwest.—W. R. Burrows, Observer, Weather Bureau, Tucson, director.

ARKANSAS.

Temperature.—The mean was 3.5 above the normal; maximum, 88, at Ashdown, 13th; minimum, 8, at Rogers, 26th; greatest monthly range, 75, at Rogers; least monthly range, 55, at Mount Nebo.

Precipitation.—The average was 4.86 above the normal; greatest monthly, 18.20, at Madding; least monthly, 4.38, at Texarkana.

Wind.—Prevailing direction, south.—F. H. Clarke, Local Forecast Official, Weather Bureau, Little Rock, director; G. G. Harkness, Observer, Weather Bureau, assistant.

CALIFORNIA.

Temperature.—The mean was 1.6 below the normal; maximum, 105, at Volcano Springs, 28th; minimum, —7, at Truckee, 3d; greatest monthly range, 67, at Winchester; least monthly range, 26, at Point Lobos.

Precipitation.—The average was 2.00 below the normal; greatest monthly, 15.41, at Crescent City Lighthouse; least monthly, 0.00, at a number of stations.

Wind.—Prevailing direction, west.—J. A. Barwick, Observer, Weather Bureau, Sacramento, director.

COLORADO.

Temperature.—The mean was 2.0 above the normal; maximum, 85, at Minneapolis, 16th; minimum, —19, at Gunnison, 7th; greatest monthly range, 76, at Brush; least monthly range, 43, at Pikes Peak.

Precipitation.—The average was 0.50 below the normal; greatest monthly, 4.81, at Climax; least monthly, trace, at Las Animas, Monte Vista, and Sanborn.

Wind.—Prevailing direction, west.—G. A. Loveland, Observer, Weather Bureau, Denver, director.

CONNECTICUT.

Temperature.—The mean was 6.6 above the normal; maximum, 72, at Canton, 19th; minimum, 11, at Voluntown, 27th; greatest monthly range, 60, at Canton; least monthly range, 44, at New London.

Precipitation.—The average was 2.94 below the normal; greatest monthly, 2.07, at New London; least monthly, 0.94, at North Grosvenor Dale.

Wind.—Prevailing direction, southwest.—J. Warren Smith, Weather Bureau, Boston, Mass., director.

DELAWARE.

Temperature.—Maximum, 84, at Milford, 22d; minimum, 17, at Millsboro, 28th; greatest monthly range, 65, at Millsboro and Milford; least monthly range, 58, at Dover.

Precipitation.—Greatest monthly, 1.60, at Millsboro; least monthly, 1.18, at Seaford.

Wind.—Prevailing direction, southwest.—Dr. William B. Clark, Johns Hopkins University, Baltimore, Md., director; C. P. Cronk, Observer, Weather Bureau, in charge.

FLORIDA.

Temperature.—The mean was 1.5 above the normal; maximum, 93, at Archer, 22d, and at Kissimmee, 21st; minimum, 29, at Pensacola and Tallahassee, 27th; greatest monthly range, 59, at Archer; least monthly range, 22, at Key West.

Precipitation.—The average was 1.25 below the normal; greatest monthly, 7.52, at Pensacola; least monthly, 0.53, at Orange City.

Wind.—Prevailing direction, east.—E. R. Demain, Observer, Weather Bureau, Jacksonville, director.

GEORGIA.

Temperature.—The mean was 4.0 above the normal; maximum, 92, at Brag and Fleming, 22d; minimum, 15, at Dahlonega, 27th; greatest monthly range, 69, at Elberton; least monthly range, 53, at Hephzibah.

Precipitation.—Greatest monthly, 7.12, at Thomasville; least monthly, 1.71, at Leverett.

Wind.—Prevailing direction, south.—Park Morrill, Local Forecast Official, Weather Bureau, Atlanta, director.

IDAHO.

Temperature.—Maximum, 72, at Boise Barracks, 27th; minimum, —12, at Lake, 5th; greatest monthly range, 66, at Fort Lemhi; least monthly range, 31, at Atlanta.

Precipitation.—Greatest monthly, 7.35, at Garden Valley; least monthly, 0.40, at Kootenai.

Wind.—Prevailing direction, south.—J. H. Smith, Observer, Weather Bureau, Idaho Falls, director.

ILLINOIS.

Temperature.—The mean was 8.6 above the normal; maximum, 85, at East Peoria, 10th; minimum, 4, at Dixon, 29th.

Precipitation.—The average was 0.05 above the normal; greatest monthly, 4.22, at Atwood; least monthly, 0.73, at Warsaw.

Wind.—Prevailing direction, south.—*John Craig, Observer, Weather Bureau, Springfield, director.*

INDIANA.

Temperature.—The mean was 8.1 above the normal; maximum, 86, at Worthington and Bedford, 21st; minimum, 8, at Hawpatch, 26th; greatest monthly range, 74, at Union City; least monthly range, 54, at Huntingburg.

Precipitation.—The average was 0.04 above the normal; greatest monthly, 7.50 at Marengo; least monthly, 0.98, at Union City.

Wind.—Prevailing direction, southwest.—*Prof. H. A. Huston, Lafayette, director; C. F. R. Wappenhans, Local Forecast Official, Weather Bureau, assistant.*

IOWA WEATHER AND CROP SERVICE.

Temperature.—The mean was 10.0 above the normal; maximum, 85, at Logan, 17th; minimum, —5, at Larrabee, Sibley, and Spirit Lake, 25th; greatest monthly range, 87, at Larrabee; least monthly range, 67, at Mount Pleasant.

Precipitation.—The average was normal; greatest monthly, 4.52, at Cedar Rapids; least monthly, 0.26, at Murray.

Wind.—Prevailing direction, south.—*J. R. Sage, Des Moines, director; G. M. Chappel, Local Forecast Official, Weather Bureau, assistant.*

KANSAS.

Temperature.—The mean was 5.7 above the normal; maximum, 92, at Englewood, 14th; minimum, zero, at Iona and Lakin, 26th; greatest monthly range, 87, at Englewood and Iona; least monthly range, 65, at Columbus.

Precipitation.—The average was 0.72 below the normal; greatest monthly, 3.48, at Marmaton; least monthly, 0.00, at Hays City.

Wind.—Prevailing direction, south.—*T. B. Jennings, Observer, Weather Bureau, Topeka, director.*

KENTUCKY.

Temperature.—The mean was 6.4 above the normal; maximum, 86, at Greendale, 21st, and at Bowling Green, 17th; minimum, 10, at Caddo, 25th, at Pellville and Richmond, 26th, and at Eubanks, 27th; greatest monthly range, 75, at Eubanks; least monthly range, 54, at Lexington.

Precipitation.—The average was 1.40 below the normal; greatest monthly, 5.35, at Canton; least monthly, 1.15, at Sandy Hook.

Wind.—Prevailing direction, southwest.—*Frank Burke, Local Forecast Official, Weather Bureau, Louisville, director.*

LOUISIANA.

Temperature.—The mean was 3.0 above the normal; maximum, 88, at Bastrop, 15th, at Liberty Hill, 13th, and at Maurepas, 20th; minimum, 22, at Davis, 26th, and at Liberty Hill, Sugartown, and Rayne, 27th; greatest monthly range, 66, at Liberty Hill; least monthly range, 37, at Port Eads.

Precipitation.—The average was 1.70 above the normal; greatest monthly, 10.48, at Monroe; least monthly, 2.91, at Cameron.

Wind.—Prevailing direction, south.—*R. E. Kerkam, Local Forecast Official, Weather Bureau, New Orleans, director.*

MAINE.

Temperature.—The mean was 4.6 above the normal; maximum, 72, at Farmington, 6th; minimum, —13, at Fort Kent, 31st; greatest monthly range, 78, at Fort Kent; least monthly range, 38, at Eastport.

Precipitation.—The average was 2.17 below the normal; greatest monthly, 2.51, at North Bridgeton; least monthly, 0.86, at Fairfield.

Wind.—Prevailing direction, southwest.—*J. Warren Smith, Weather Bureau, Boston, Mass., director.*

MARYLAND.

Temperature.—Maximum, 86, at Benedict, 20th; minimum, 2, at Sunnyside, 28th; greatest monthly range, 72, at Sunnyside; least monthly range, 53, at New Market.

Precipitation.—Greatest monthly, 2.84, at Woodstock; least monthly, 0.65, at Mount St. Marys.

Wind.—Prevailing directions, southwest and northwest.—*Dr. William B. Clark, Johns Hopkins University, Baltimore, director; C. P. Cronk, Observer, Weather Bureau, in charge.*

MASSACHUSETTS.

Temperature.—The mean was 8.5 above the normal; maximum, 79, at Lowell (c), 19th; minimum, 4, at Ludlow, 27th; greatest monthly range, 63, at Groton and Leicester; least monthly range, 30, at Nantucket.

Precipitation.—The average was 2.88 below the normal; greatest monthly, 2.45, at Fall River; least monthly, 0.37, at Cambridge (a).

Wind.—Prevailing direction, southwest.—*J. Warren Smith, Weather Bureau, Boston, director.*

MICHIGAN.

Temperature.—The mean was 8.9 above the normal; maximum, 78, at Rawsonville, 18th, and Alma, 19th; minimum, —3, at Evart, 27th; greatest monthly range, 76, at Evart; least monthly range, 48, at Escanaba and Lake City.

Precipitation.—The average was 0.16 below the normal; greatest monthly, 5.71, at Boon; least monthly, 0.40, at Olivet.

Wind.—Prevailing direction, southwest.—*E. A. Evans, Local Forecast Official, Weather Bureau, Detroit, director.*

MINNESOTA.

Temperature.—Maximum, 81, at Granite Falls, 17th; minimum, —24, at Pokegama Falls, 27th; greatest monthly range, 87, at Granite Falls; least monthly range, 56, at Crookston and Duluth.

Precipitation.—Greatest monthly, 4.67, at Cromwell; least monthly, 0.74, at Mazeppa.

Wind.—Prevailing direction, northwest.—*E. A. Beals, Observer, Weather Bureau, Minneapolis, director.*

MISSISSIPPI.

Temperature.—The mean was 3.0 above the normal; maximum, 88, at Hattiesburg, 16th, and at Water Valley, 22d; minimum, 18, at French Camps and Louisville, 27th.

Precipitation.—The average was normal; greatest monthly, 10.11, at Edwards; least monthly, 2.69, at University.—*R. J. Hyatt, Local Forecast Official, Weather Bureau, Vicksburg, director.*

MISSOURI.

Temperature.—The mean was 7.2 above the normal; maximum, 89, at Harrisonville, 17th; minimum, 5, at Arthur, 26th; greatest monthly range, 79, at Harrisonville; least monthly range, 50, at Gayoso.

Precipitation.—The average was 0.30 above the normal; greatest monthly, 7.97, at Gayoso; least monthly, 0.39, at Brunswick.

Wind.—Prevailing direction, southwest.—*A. E. Hackett, Observer, Weather Bureau, Columbia, director.*

MONTANA.

Temperature.—The mean was 3.0 below the normal; maximum, 71, at Mingsville, 2d; minimum, —20, at Mingsville, 25th; greatest monthly range, 91, at Mingsville; least monthly range, 45, at Fort Missoula.

Precipitation.—The average was 1.00 above the normal; greatest monthly, 4.03, at Miles City; least monthly, 0.56, at Deer Lodge City.

Wind.—Prevailing direction, southwest.—*J. M. Sherier, Observer, Weather Bureau, Helena, director.*

NEBRASKA.

Temperature.—The mean was 3.7 above the normal; maximum, 88, at Hebron, 17th; minimum, —9, at Bassett, 25th; greatest monthly range, 92, at Glenwood; least monthly range, 60, at Burwell.

Precipitation.—The average was 0.20 below the normal; greatest monthly, 3.19, at Crete; least monthly, 0.20, at Haigler.

Wind.—Prevailing direction, northwest.—*George E. Hunt, Local Forecast Official, Weather Bureau, Omaha, director.*

NEVADA.

Temperature.—The mean was 1.0 below the normal; maximum, 88, at Downeyville, 11th; minimum, —13, at Stofiel, 22d; greatest monthly range, 76, at McGill; least monthly range, 46, at Golconda.

Precipitation.—The average was 0.44 below the normal; greatest monthly, 5.28, at Ely; least monthly, 0.00, at Hot Springs.

Wind.—Prevailing direction, southwest.—*Prof. Charles W. Friend, Carson City, director; F. A. Carpenter, Observer, Weather Bureau, assistant.*

NEW HAMPSHIRE.

Temperature.—The mean was 7.0 above the normal; maximum, 76, at Nashua, 19th; minimum, —3, at Stratford, 28th, and at West Milan, 1st and 28th; greatest monthly range, 75, at West Milan; least monthly range, 51, at East Canterbury.

Precipitation.—The average was 1.97 below the normal; greatest monthly, 2.43, at North Conway; least monthly, 0.64, at Peterboro.

Wind.—Prevailing direction, southwest.—*J. Warren Smith, Weather Bureau, Boston, Mass., director.*

NEW JERSEY.

Temperature.—The mean was 7.4 above the normal; maximum, 83, at Millville and Vineland, 22d; minimum, 12, at Allaire, 28th; greatest monthly range, 66, at Allaire and Woodbine; least monthly range, 46, at Oceanic.

Precipitation.—The average was 2.01 below the normal; greatest monthly, 2.65, at Toms River; least monthly, 1.09, at Dover.

Wind.—Prevailing direction, northwest.—*E. W. McGann, Observer, Weather Bureau, New Brunswick, director.*

NEW MEXICO.

Temperature.—The mean was normal; maximum, 86, at Rincon, 14th; minimum, —10, at Hot Sulphur Springs, 5th; greatest monthly range, 73, at Chama; least monthly range, 51, at Galisteo and Santa Fe.

Precipitation.—The average was slightly below the normal; greatest monthly, 2.60, at Chama; least monthly, 0.00, at Albert.—*H. B. Hersey, Observer, Weather Bureau, Santa Fe, director.*

NEW YORK.

Temperature.—The mean was 7.8 above the normal; maximum, 80, at Eden Center, 18th; minimum, 1, at Number Four, 27th; greatest monthly range, 72, at Varysburg; least monthly range, 42, at Willets Point.

Precipitation.—The average was 1.13 below the normal; greatest monthly, 4.48, at Bovina Center; least monthly, 0.58, at Romulus.

Wind.—Prevailing direction, south.—*Prof. E. A. Fuytes, Dean of the College of Civil Engineering, Cornell University, Ithaca, director; R. M. Hardinge, Observer, Weather Bureau, assistant.*

NORTH CAROLINA.

Temperature.—The mean was 6.3 above the normal; maximum, 93, at Washington, 22d; minimum, 4, at Highlands, 27th; greatest monthly range, 78, at Rutherford College; least monthly range, 37, at Southport.

Precipitation.—The average was 2.85 below the normal; greatest monthly, 4.77, at Falkland; least monthly, 0.67, at Marion.

Wind.—Prevailing direction, southwest.—*Dr. Herbert B. Battle, Raleigh, director; C. F. von Herrmann, Observer, Weather Bureau, assistant.*

NORTH DAKOTA.

Temperature.—The mean was 3.5 above the normal; maximum, 69, at Ashley and Fort Yates, 16th; minimum, -22, at Woodbridge, 25th; greatest monthly range, 90, at Ashley; least monthly range, 58, at Grafton.

Precipitation.—The average was 0.77 above the normal; greatest monthly, 3.52, at Washburn; least monthly, 0.45, at New Salem.

Wind.—Prevailing direction, northwest.—*B. H. Bronson, Observer, Weather Bureau, Bismarck, director.*

OHIO WEATHER AND CROP SERVICE.

Temperature.—The mean was 9.0 above the normal; maximum, 91, at Portsmouth, 20th; minimum, 3, at Bowling Green, 26th; greatest monthly range, 77, at Coalton; least monthly range, 55, at Cleveland.

Precipitation.—The average was 0.63 below the normal; greatest monthly, 3.54, at Bangorville; least monthly, 0.83, at Pomeroy and Thurman.

Wind.—Prevailing direction, southwest.—*L. N. Bonham, Columbus, director; C. M. Strong, Observer, Weather Bureau, assistant.*

OKLAHOMA.

Temperature.—The mean was 7.0 above the normal; maximum, 94, at Anadarko, 18th; minimum, 9, at Fort Supply, 28th, and at Pond Creek, 29th; greatest monthly range, 81, at Purcell; least monthly range, 61, at South McAlester.

Precipitation.—The average was 0.50 above the normal; greatest monthly, 7.28, at Kemp; least monthly, 0.10, at Buffalo.

Wind.—Prevailing direction, south.—*J. I. Widmeyer, Observer, Weather Bureau, Oklahoma City, director.*

OREGON.

Temperature.—The mean was 1.2 below the normal; maximum, 83, at Newport, 24th; minimum, -12, at Burns, 3d; greatest monthly range, 76, at Burns; least monthly range, 25, at Bandon.

Precipitation.—The average was 1.58 above the normal; greatest monthly, 25.63, at Glenora; least monthly, 0.70, at Burns and Fife.

Wind.—Prevailing direction, southwest.—*S. M. Blanford, Observer, Weather Bureau, Portland, director.*

PENNSYLVANIA.

Temperature.—The mean was 8.2 above the normal; maximum, 84, at Aqueduct, 22d; minimum, -2, at Saegertown, 28th; greatest monthly range, 77, at Saegertown; least monthly range, 50, at Altoona.

Precipitation.—The average was 1.94 below the normal; greatest monthly, 2.90, at Uniontown; least monthly, 0.24, at Wellsboro.

Wind.—Prevailing direction, west.—*Under direction of the Franklin Institute, Philadelphia; W. P. Tatham, director; T. F. Townsend, Local Forecast Official, Weather Bureau, assistant.*

RHODE ISLAND.

Temperature.—The mean was 6.8 above the normal; maximum, 66, at Pawtucket and Providence, 6th; minimum, 14, at Kingston, 27th; greatest monthly range, 48, at Providence; least monthly range, 36, at Block Island.

Precipitation.—The average was 2.28 below the normal; greatest monthly, 2.15, at Block Island; least monthly, 1.10, at Bristol.

Wind.—Prevailing direction, southwest.—*J. Warren Smith, Weather Bureau, Boston Mass., director.*

SOUTH CAROLINA.

Temperature.—The mean was 5.0 above the normal; maximum, 90, at Columbia, 22d, and at Cheraw(a), 17th; minimum, 18, at Hollands Store, 27th; greatest monthly range, 68, at Hollands Store; least monthly range, 45, at Timmonsville.

Precipitation.—The average was 2.14 below the normal; greatest monthly, 3.49, at Pinopolis; least monthly, 0.71, at Little Mountain.

Wind.—Prevailing direction, southwest.—*J. W. Bauer, Observer, Weather Bureau, Columbia, director.*

SOUTH DAKOTA.

Temperature.—The mean was 4.7 above the normal; maximum, 86, at Alexandria, 16th; minimum, -23, at Ashcroft, 24th; greatest monthly range, 93, at De Smet; least monthly range, 71, at Bowdle and Rapid City.

Precipitation.—The average was 1.26 above the normal; greatest monthly, 7.40, at Spearfish; least monthly, 0.50, at Tyndall.

Wind.—Prevailing direction, northwest.—*S. W. Glenn, Local Forecast Official, Weather Bureau, Huron, director.*

TENNESSEE WEATHER AND CROP SERVICE.

Temperature.—The mean was 5.2 above the normal; maximum, 84, at Springdale, 15th, 19th, and 20th, at Byrdstown, 19th, and at Newport, 20th; minimum, 11, at Byrdstown, 27th; greatest monthly range, 73, at Byrdstown; least monthly range, 56, at Covington.

Precipitation.—The average was 1.05 below the normal; greatest monthly, 10.90, at Memphis; least monthly, 1.21, at Strawberry Plains.

Wind.—Prevailing direction, south.—*J. B. Marbury, Local Forecast Official, Weather Bureau, Nashville, director.*

TEXAS.

Temperature.—The mean was 0.6 above the normal; maximum, 100, at Fort Ringgold, 19th, and at Aurora, 13th; minimum, 8, at Fort Hancock, 21st; greatest monthly range, 78, at Fort Hancock; least monthly range, 38, at Galveston.

Precipitation.—The average was 0.46 below the normal; greatest monthly, 9.53, at Arthur City; least monthly, 0.00, at six stations.

Wind.—Prevailing direction, south.—*D. D. Bryan, Galveston, director; I. M. Cline, Local Forecast Official, Weather Bureau, assistant.*

UTAH.

Temperature.—Maximum, 85, at Saint George, 13th; minimum, -22, at Scofield, 7th; greatest monthly range, 86, at Scofield; least monthly range, 47, at Salt Lake City.

Precipitation.—Greatest monthly, 7.60, at Silver Lake; least monthly, 0.18, at Saint George.

Wind.—Prevailing direction, southwest.—*G. N. Salisbury, Observer, Weather Bureau, Salt Lake City, director.*

VERMONT.

Temperature.—The mean was 6.8 above the normal; maximum, 76, at Brattleboro, 19th; minimum, 3, at Irasburg, 27th; greatest monthly range, 62, at Brattleboro; least monthly range, 51, at Burlington.

Precipitation.—The average was 2.09 below the normal; greatest monthly, 2.40, at Enosburg Falls; least monthly, 0.45, at Cornwall.

Wind.—Prevailing direction, southwest.—*J. Warren Smith, Weather Bureau, Boston, Mass., director.*

VIRGINIA.

Temperature.—Maximum, 92, at Richmond, 22d; minimum, 9, at Hot Springs, 28th; greatest monthly range, 77, at Richmond; least monthly range, 59, at Cape Henry.

Precipitation.—Greatest monthly, 3.15, at Birdsnest; least monthly, 0.33, at Christiansburg.

Wind.—Prevailing direction, southwest.—*Dr. E. A. Craighill, Lynchburg, director; J. N. Ryker, Observer, Weather Bureau, assistant.*

WASHINGTON.

Temperature.—The mean was 3.5 below the normal; maximum, 72, at Aberdeen, 24th; minimum, 7, at Hunters, 4th; greatest monthly range, 54, at Moxee Valley; least monthly range, 21, at Tatoosh Island.

Precipitation.—The average was 1.80 above the normal; greatest monthly, 13.70, at Neah Bay; least monthly, 0.49, at Connell.

Wind.—Prevailing direction, southwest.—*H. F. Alciatore, Observer, Weather Bureau, Seattle, director.*

WEST VIRGINIA.

Temperature.—Maximum, 88, at New Martinsville, 20th; minimum, 1, at Davis, 28th; greatest monthly range, 78, at Davis; least monthly range, 62, at Wheeling.

Precipitation.—Greatest monthly, 3.05, at Pleasant Hill; least monthly, 0.74, at Bloomery.

Wind.—Prevailing direction, west.—*H. W. Richardson, Observer, Weather Bureau, Parkersburg, director.*

WISCONSIN.

Temperature.—The mean was 8.0 above the normal; maximum, 82, at Prairie du Chien, 17th; minimum, -11, at Butternut, 27th; greatest monthly range, 84, at Weston; least monthly range, 48, at Bayfield.

Precipitation.—The average was normal; greatest monthly, 5.09, at Bayfield; least monthly, 0.98, at Stevens Point.

Wind.—Prevailing direction, southwest.—*W. L. Moore, Local Forecast Official, Weather Bureau, Milwaukee, director.*

WYOMING.

Temperature.—The mean was normal; maximum, 76, at Wheatland, 13th; minimum, -14, at Sheridan, 25th; greatest monthly range, 78, at Sheridan; least monthly range, 45, at Saratoga.

Precipitation.—The average was 0.94 above the normal; greatest monthly, 3.96, at Lander (V. O.); least monthly, 0.46, at Camp Pilot Butte.

Wind.—Prevailing direction, west.—*E. M. Ravenscraft, Observer, Weather Bureau, Cheyenne, director.*

INLAND NAVIGATION.

STAGE OF WATER IN RIVERS.

The following table shows the danger point at each river station; the highest and lowest stages for the month of March, 1894, with the dates of occurrence, and the monthly range:

Heights of rivers above low-water mark, March, 1894.

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Height.	Date.	Height.	Date.	
<i>Red River.</i>						
Shreveport, La.	29.2	33.5	31	15.8	12, 13	17.7
<i>Arkansas River.</i>						
Fort Smith, Ark.	22.0	17.6	8, 9	3.9	4	13.7
Little Rock, Ark.	23.0	22.6	22	7.0	5	15.6
<i>Missouri River.</i>						
Pierre, S. Dak.	13.0					
Sioux City, Iowa	18.7	10.9	22	6.0	29	4.9
Omaha, Nebr.	18.0					
Kansas City, Mo.	21.0	13.0	7, 26	7.2	1	5.8
<i>Mississippi River.</i>						
St. Paul, Minn.	14.0	4.5	9	2.0	28	2.5
La Crosse, Wis.	10.0	7.4	27, 28	5.6	12	1.8
Dubuque, Iowa	16.0	8.0	31	5.6	8	2.4
Davenport, Iowa	15.0	6.5	7, 8	4.4	5	2.9
Keokuk, Iowa	14.0	8.1	9	5.2	4	2.9
Hannibal, Mo.	17.0	9.3	10	2.0	1	7.3
St. Louis, Mo.	30.0	20.1	11	5.3	2, 3	14.8
Cairo, Ill.	40.0	32.3	12	22.4	5, 6	9.9
Memphis, Tenn.	33.0	24.5	15	16.8	7, 8	7.7
Vicksburg, Miss.	41.0	40.8	31	32.8	12	8.0
New Orleans, La.	13.0	13.7	31	12.0	16-18	1.7
<i>Ohio River.</i>						
Parkersburg, W. Va.	38.0	18.7	10	9.5	1	9.2
Cincinnati, Ohio	45.0	27.5	12, 13	17.8	19, 22	9.7
Louisville, Ky.	24.0	10.3	13, 14	7.9	22	2.4
<i>Cumberland River.</i>						
Nashville, Tenn.	40.0	19.2	5	10.0	16	9.2
<i>Tennessee River.</i>						
Chattanooga, Tenn.	33.0	9.7	4	5.2	31	4.5
Knoxville, Tenn.	29.0	5.0	2	2.0	31	3.0
<i>Monongahela River.</i>						
Pittsburg, Pa.	22.0	14.0	8	4.8	1	9.2
<i>Savannah River.</i>						
Augusta, Ga.	32.6	20.8	2	8.0	31	12.8
<i>Willamette River.</i>						
Portland, Oregon	15.0	18.0	19	5.6	5	12.4
<i>Susquehanna River.</i>						
Harrisburg, Pa.	17.0	12.2	9	3.2	1	9.0
<i>Alabama River.</i>						
Montgomery, Ala.	48.0	19.9	23, 24	6.5	12, 13	13.4
<i>James River.</i>						
Lynchburg, Va.	18.0	4.7	3	1.1	31	3.6
<i>Sacramento River.</i>						
Red Bluff, Cal.	22.0	9.5	31	5.2	25	4.3
Sacramento, Cal.	25.0	21.8	1, 2	19.5	13-17	2.3
<i>Des Moines River.</i>						
Des Moines, Iowa	19.0	4.5	5-7	3.3	31	1.2

* For 25 days. † For 24 days. ‡ For 21 days. § For 23 days. || For 26 days.

FLOODS.

The above table shows that in the rivers here recorded the water has risen above the danger line at Portland, Oreg., New Orleans and Shreveport, La., and very closely approached the danger line at Vicksburg, Miss., and Little Rock, Ark. The following special reports have also been received:

Arkansas and Ouachita Rivers.—The greatest flood in the history of south-central Arkansas occurred on the 18th-21st, and the whole State approached the condition of an overflowed region; it rained almost incessantly for five days, and the rainfall averaged approximately 6 inches, reaching about 7½ at Hot Springs and Memphis. The Arkansas River rose rapidly, and the Ouachita reached its highest point for fifty years; traffic was generally suspended on the railroads between Memphis, Little Rock, Hot Springs, and the surrounding country.

Powder River.—Baker City, Oreg., 15th, the river was the highest known in years, low lands flooded; 28th, river rising rapidly; 29th, two foot bridges washed away. A levee at Wilovale, a suburb of Baker City, broke and flooded that portion of the city.

Red River.—Shreveport, La., 28th, river has passed the danger line and rising rapidly; 29th, a crevasse at the Pruitt, about 15 miles south of Shreveport; 30th, river continues to rise; 31st, levee broke on Hendersons place.

Susquehanna River.—Wilkesbarre, 9th, river overflowed its west bank this morning.

NAVIGATION OF RIVERS AND HARBORS.

The weekly "bulletin of depth of snow lying on the ground" gives reports of ice in rivers and harbors, and shows that on Monday, March 5, the ice in the Mississippi River was,

at La Crosse, Wis., 15 inches thick; the Platte, at Kearney, Nebr., 12; Missouri, at Williston, N. Dak., 40; Bismarck, N. Dak., 27.5; Pierre, S. Dak., 26. On the Lakes the ice was, at Duluth, Minn., 29.5; Marquette, Mich., 10.5; Sault Ste. Marie, Mich., 30; Grand Haven, Mich., 6; Erie, Pa., 0.5; Oswego, N. Y., 8.

On Monday, 12th, Williston, N. Dak., 36; Bismarck, N. Dak., 26th; Pierre, S. Dak., 24; Duluth, Minn., 24; Sault Ste. Marie, Mich., 14.

On Monday, 19th, Williston, N. Dak., 32; Duluth, Minn., 12; Sault Ste. Marie, Mich., 11.5.

Monday, 26th, Williston, N. Dak., 36; Bismarck, N. Dak., 4; Pierre, S. Dak., 1; Duluth, Minn., 13; Sault Ste. Marie, Mich., 14.

The following special reports have also been received:

Black River.—Port Huron, Mich., 5th, ice in river broke during the early morning and it was about clear in the evening.

Connecticut River.—Hartford, Conn., 4th, river opened for navigation. Middletown, Conn., 8th, navigation opened to Long Island Sound.

Des Moines River.—Des Moines, Iowa, 5th, ice all melted in river.

Detroit River.—Detroit, Mich., 6th, the high temperature and winds of the last few days have cleared the river of ice; 11th, ferryboat made first trip and a tug from Port Huron reports Detroit River and lakes St. Clair and Huron free from ice; first steamer left on the 19th.

East River.—New York, N. Y., 1st, small amount of ice floating in East River and New York harbor.

Hudson River.—Albany, N. Y., 9th, navigation resumed between Newburg and New York; 17th, the first boat of the season passed up the river to-day; Albany and Newburg line of steamers began making regular trips, opening navigation. Wappingers Falls, N. Y., 8th, ice broke up in the river and navigation opened on the 9th.

Kennebec River.—Gardiner, Me., 23d, river opened.

Straits of Mackinac.—Cheboygan, Mich., 12th, the ice bridge broken up and the opening of the straits for the present season must date from the 11th, as against April 17 last season; 12th, the straits are clear as far as Point Au Sable, but the St. Ignace is stuck in the ice off McGulpin Point. A day or two will open the straits clear through. St. Ignace, Mich., 17th, north passage of straits opened; 19th, the ferry between St. Ignace and Mackinac Island commenced running; 23d, south passage of straits clear of ice. The ice floe, pushed up on the shore at "Old Mackinaw" near the fort, was piled up from 18 to 30 feet high, and large boulders were shoved along with it.

Mississippi River.—St. Paul, Minn., 7th, river partly opened; 8th, river observations resumed; 9th, floating ice. Winona, Wis., 8th, river opened.

La Crosse, Wis., 10th, ice moving out of river; 25-26th, river full of floating ice. Davenport, Iowa, 4th, ice began moving out to-day and channel opened some distance below city; 5th, large quantities of floating ice in river near shore; 6th, river nearly clear; 7th, considerable floating ice; 8th, river nearly clear; 9th, river clear; 13th, first steamer of the season arrived to-day, opening navigation. Keokuk, Iowa, 9th, a steamer passed up the river to-day, opening navigation for the season. Le Claire, Iowa, 5th, ice broke up in river, 8 a. m.; 6th, river full of floating ice. Muscatine, Iowa, 3d, ice moved out of river. North McGregor, Iowa, 5th, ice broke up; 26th, river frozen; 28th, river full of floating ice; 30th, river clear.

Missouri River.—Fort Buford, N. Dak., 16th, ice in river broke up and moved out during the afternoon, leaving channel below bridge clear. Santee Agency, Mo., 9th, ice broke up in river. Niobrara City, Nebr., 12th, navigation on the river opened. Omaha, Nebr., 4th, ice in river broken up and river full of floating ice; 8th, river clear. Cumberland, S. Dak., 14th, ice broke up in river. Greenwood, S. Dak., 10th, the ice passed out of river. Sioux City, Iowa, 4th, ice passed out of the river during the day, doing some damage to boats and sinking one steamer; navigation opened 25th, river full of floating ice. Hermann, Mo., 24th, navigation on the river opened.

Penobscot River.—Orono, Me., 30th, river opened.

St. Lawrence River.—North Hammond, N. Y., 12th, river clear of ice.

St. Clair River.—Port Huron, Mich., 5th, no ice in the St. Clair River; 11th, a schooner left for Alpena, Mich., thus opening navigation for the season on Lake Huron; 15th, a steamer arrived from Detroit, opening navigation on the St. Clair River.

Lake Champlain.—Burlington, Vt., 15th, ice passed out of lake; 26th, navigation resumed.

Lake Erie.—Cleveland, Ohio, 10th, a tug left here for Port Huron to-day, being the first boat of the season to leave; 12th, a small steamer arrived to-day, being the first of the season; 14th, a dozen of the heaviest carriers on the great chain of lakes will leave here to-morrow. The lake navigation season will be opened six weeks earlier than for years. Erie, Pa., 13th, navigation opened. Toledo, Ohio, 22d, navigation opened.

Lake Huron.—Alpena, Mich., 13th, a steamer arrived to-day, opening navigation.

Lake Michigan.—Grand Haven, Mich., 11th, ice in lake off harbor dis-

appeared and navigation opened. Harbor Springs, Mich., 20th, ice passed out of bay; 24th, harbor clear of ice; 25th, harbor and bay frozen over. Milwaukee, Wis., 12th, navigation opened. Green Bay, Wis., 8th, river clear of ice; 11th, the bay is clear of ice; 31st, first boat arrived, opening navigation.

Lake Ontario.—Oswego, N. Y., 30th, the schooner *Julia*, from Kingston, Ont., arrived to-day and opened navigation for the season.

Lake Superior.—Two Harbors, Minn., 16th, the harbor of the lake practically clear of ice at this point.

OBSERVATIONS ON THE GREAT LAKES.

Owing to the close of navigation on the Great Lakes during the winter season the Weather Bureau has received no reports from vessels for the month of March, and from only one U. S. Life-Saving station.

SUNSHINE AND CLOUDINESS.

SUNSHINE.

During the month an instrumental record of the amount of sunshine has been kept at 15 stations by means of the photographic sunshine recorder and at 21 stations by means of the thermometric sunshine recorder; the results of these observations are given in Table IV, which shows the actual percentage of sunshine received on the average of the month for any hour of local mean time (not seventy-fifth mean time).

The stations recording the largest percentage of sunshine between the hours of 11 a. m. and 1 p. m., are: Colorado Springs, Colo., 86.0; Denver, Colo., 82.5; Detroit, Mich., 81.5; Dodge City, Kans., 81.0; Key West, Fla., 86.5; Saint Louis, Mo., 86.5; Santa Fe, N. Mex., 81.5; Vicksburg, Miss., 86.0.

The stations having the least percentage during these hours, are: Portland, Oreg., 23; Cleveland, Ohio, 54; Cincinnati, Ohio, 55.

The general average sunshine for the whole month is given in the next to the last column of Table IV. The highest percentages are: Key West, Fla., 82; Santa Fe, N. Mex., 77; St. Louis, Mo., 75; Dodge City, Kans., Denver, Colo., and Tucson, Ariz., 74; Kansas City, Mo., 70. The lowest percentages are: Portland, Oreg., 24; Salt Lake City, Utah, 53; Chicago, Ill., 52; Buffalo, N. Y., 53; Galveston, Tex., 54; New Orleans, La., 55.

CLOUDINESS.

The number of clear and cloudy days and the average cloudiness between sunrise and sunset, as based on numerous personal observations, are given for each Weather Bureau station in Table I. The complement of this average cloudiness gives the observer's estimated percentage of clear sky, and these latter numbers are given in the last column of Table IV. On the average these personal estimates of clear sky are lower by about 8 per cent than the sunshine as recorded by the thermometric registers and lower by 11 per cent than the sunshine recorded by photographic registers.

GENERAL REMARKS.

The quantity of direct sunshine received at any station is approximately shown by the self-recording sunshine registers

which work either by photography or by thermometry. The quantity of direct sunshine, or blue sky light, received at the same station is approximately shown by the estimated cloudiness, and the complement of this number is an approximate value of the average amount of sunshine received by the surrounding country, as distinguished from the station itself. As has been explained in previous WEATHER REVIEWS there is no necessary agreement between the local sunshine register and the observer's estimate of the cloudiness of the sky. In the following table there are brought together, side by side, the instrumental records of the percentage of duration of sunshine and the observer's personal estimate of the percentage of area of the sky covered by clouds, and, in accord with the results of previous months, it is seen that the differences are rather larger for comparatively clear skies but smaller for cloudy skies:

Difference between instrumental and personal observations of sunshine.

Station.	Photographic register.			Station.	Thermometric register.		
	Instrumental.	Personal.	Difference.		Instrumental.	Personal.	Difference.
Santa Fe, N. Mex.	77	63	14	Key West, Fla.	82	62	20
Dodge City, Kans.	74	62	12	St. Louis, Mo.	75	64	11
Tucson, Ariz.	74	59	15	Colorado Springs, Colo.	68	50	18
Denver, Colo.	74	49	25	Philadelphia, Pa.	68	47	21
Kansas City, Mo.	70	65	5	Vicksburg, Miss.	66	65	1
Savannah, Ga.	69	60	9	Baltimore, Md.	66	57	9
Washington, D. C.	63	60	3	Detroit, Mich.	66	45	21
Memphis, Tenn.	61	58	3	Columbus, Ohio.	64	45	19
Cleveland, Ohio.	59	45	14	Wilmington, N. C.	62	64	-2
San Francisco, Cal.	57	53	4	Des Moines, Iowa.	62	51	11
Cincinnati, Ohio.	55	51	4	Portland, Me.	62	45	17
Galveston, Tex.	54	54	0	New Haven, Conn.	61	40	21
Portland, Oreg.	24	25	-1	Louisville, Ky.	60	47	13
Eastport, Me.	35	.....	.....	New York, N. Y.	60	46	14
San Diego, Cal.	62	.....	.....	Little Rock, Ark.	60	45	15
				Boston, Mass.	60	41	19
				New Orleans, La.	55	54	1
				Salt Lake City, Utah	53	40	13
				Buffalo, N. Y.	53	39	14
				Chicago, Ill.	52	51	1
				Rochester, N. Y.	.....	41	.....

NOTES BY THE EDITOR.

OLD RECORDS OF COLD WEATHER IN MARCH IN MARYLAND.

In connection with the disastrous cold weather of the latter part of March, the voluntary observer, Mr. A. E. Acworth, of Mardela Springs (formerly Barren Creek Springs), Wicomico Co., Md., communicates the following extracts from old records kept by the late Dr. Ker, at Princess Anne, Somerset Co., Md., from 1823 to 1849, which show the dates in March of each successive year on which temperature fell to 32°, or below, also the recorded temperature itself in degrees; the dates on which frost, ice, or snow occurred are also given:

1823.—Temperature, 1st, 24; 4th, 28. Frost, 9th, 26th. Snow, 2d.
 1827.—Temperature, none. Frost, 31st.
 1830.—Temperature, 10th, 32. Frost, 5th, 10th, 20th.
 1831.—Temperature, 18th, 32; 21st, 32. Frost, 2d, 8th, 9th, 11th, 22d. Snow, 17th.
 1832.—Temperature, 15th, 30; 16th, 32; 18th, 23-24; 19th, 26. Frost, 2d, 16th, 28th, 29th, 31st.
 1834.—Temperature, 23d, 32. Frost, 14th, 17th, 31st. Ice, 31st. Snow, 3d.
 1836.—Temperature, 3d, 29-30; 12th, 30-31; 13th, 28-29; 16th, 32; 26th, 32. Frost, 4th, 9th, 13th, 16th, 25th, 27th. Snow, 22d.
 1837.—Temperature, 1st, 31; 4th, 22; 5th, 27-28; 6th, 31. Frost, 12th, 17th, 21st. Snow, 3d, 24th.
 1838.—Temperature, 1st, 26; 3d, 30; 4th, 31. Frost, 13th, 24th. Snow, 2d.

1840.—Temperature, 11th, 32; 12th, 31; 26th, 32. Frost, 6th, 26th. Ice, 6th, 22d.
 1841.—Temperature, 15th, 30; 17th, 28; 18th, 28. Frost, 4th, 24th. Snow, 5th, 17th, 18th.
 1842.—Temperature, none. Frost, 15th, 16th.
 1843.—Temperature, 2d, 28; 3d, 22; 4th, 24; 5th, 29; 6th, 26; 7th, 28; 8th, 28; 14th, 29; 18th, 30; 19th, 28; 20th, 29; 21st, 31; 23d, 31; 24th, 21; 25th, 28; 26th, 32; 27th, 32. Frost, 22d, 30th. Snow, 17th.
 1844.—Temperature, 5th, 32; 6th, 30; 19th, 32. Frost, 6th, 12th. Snow, 31st.
 1846.—Temperature, 1st, 32; 3d, 26; 4th, 22. Frost, 11th, 22d, 31st. Snow, 2d.
 1847.—Temperature, 17th, 30 (Manokin River frozen over). Frost, 6th, 15th, 19th. Snow, 13th, 27th.
 1848.—Temperature, 4th, 31; 6th, 26; 15th, 26; 16th, 22; 17th, 30. Frost, 25th.
 1849.—Temperature, none. Frost, 23d.

Mr. Acworth also communicates the following extracts from his own records for Mardela Springs, Wicomico Co., Md. According to his maximum and minimum thermometer the temperature fell to 32°, or below, as follows:

1889.—Temperature, 1st, 30; 2d, 31; 10th, 32; 11th, 32; 12th, 25; 23d, 26th, and 29th, 30; 30th, 32; 31st, 31. Frost, 1st, 2d, 12th, 13th, 18th, 23d, 28th, 29th. Snow, 21st, 29th.
 1890.—Temperature, 1st, 31; 2d, 25; 3d, 20; 4th, 24; 5th, 31; 6th, 23; 7th, 13; 8th, 24; 9th, 19; 10th, 20; 16th, 24; 17th and 20th, 28; 24th, 30. Frost, 4th, 10th, 20th. Snow, 1st, 2d, 3d, 6th, 15th.
 1891.—Temperature, 1st, 25; 2d, 26; 5th and 6th, 29; 14th, 30; 15th, 27; 17th, 30. Frost, 6th, 11th, 18th, 29th, 30th, 31st. Ice, 26th, 29th. Snow, 28th.
 1892.—Temperature, 1st, 31; 2d, 26; 4th, 25; 7th, 21; 11th, 20; 12th, 23; 13th and 14th, 25; 15th, 24; 16th, 22; 17th, 19; 18th, 29; 19th, 24; 20th, 30; 21st, 23; 22d, 17; 30th, 29. Frost, 22d, 25th. Snow, 2d, 11th, 18th.
 1893.—Temperature, 1st, 32; 5th, 15; 6th, 16; 7th, 27; 8th, 23; 13th, 32; 15th, 30; 16th, 22; 17th, 21; 18th, 29; 19th, 31; 27th and 28th, 26; 29th, 30. Frost, 1st, 2d, 4th, 8th, 13th, 17th, 27th, 29th, 30th. Ice, 29th. Snow, 4th, 17th.
 1894.—Temperature, 1st, 29; 2d, 29; 4th, 25; 13th, 32; 15th, 27; 26th, 29; 27th, 22; 28th, 16; 30th, 32. Frost, 1st, 2d, 4th, 13th, 15th, 17th, 24th, 28th. Ice, 27th, 28th, 30th. Snow, 25th.

OBSERVATIONS AT HONOLULU, HAWAIIAN ISLANDS.

Meteorological observations at Honolulu, Hawaiian Islands, for March, 1894, by Curtis J. Lyons, Meteorologist to the Government Survey.

Date.	Barometer at sea level.			Temperature.					Humidity.			Wind.		Rain to 6 p. m.
	9 a. m.	3 p. m.	9 p. m.	6 a. m.	2 p. m.	9 p. m.	Minimum.	Maximum.	Relative.		Absolute.	Direction.	Force.	
									9 a. m.	9 p. m.				
	<i>Ins.</i>	<i>Ins.</i>	<i>Ins.</i>	<i>o</i>	<i>o</i>	<i>o</i>	<i>o</i>	<i>o</i>	<i>Pr. ct.</i>	<i>Pr. ct.</i>			<i>Ins.</i>	
1.....	30.20	30.13	30.20	69	72	71	65	74	75	75	6.3	ne.	4	0.66
2.....	30.21	30.15	30.23	71	75	70	69	77	70	74	6.1	ne.	5	0.22
3.....	30.24	30.17	30.26	71	75	72	68	76	70	70	6.1	ne.	5	0.05
4.....	30.26	30.17	30.22	70	75	69	69	76	67	77	5.9	e., ne.	5	0.05
5.....	30.24	30.15	30.20	69	75	72	69	76	70	70	6.0	ne.	5	0.01
6.....	30.24	30.16	30.23	70	74	71	70	75	67	62	5.5	ne.	5.6	0.05
7.....	30.25	30.19	30.26	70	73	71	69	74	73	66	5.7	ne.	5.6	0.00
8.....	30.24	30.17	30.22	70	74	70	67	75	74	74	5.8	ne.	5.6	0.00
9.....	30.20	30.10	30.18	67	75	69	66	75	66	70	5.7	ne.	5	0.25
10.....	30.12	30.06	30.14	68	74	70	68	74	67	77	5.8	ne.	5	0.00
11.....	30.11	30.04	30.11	69	74	71	68	76	66	69	5.8	ne.	5	0.01
12.....	30.10	30.06	30.14	68	74	71	66	77	67	73	6.1	ne.	4	0.33
13.....	30.15	30.08	30.16	70	75	72	68	76	70	72	6.1	ne.	5	0.20
14.....	30.18	30.08	30.18	69	77	71	68	78	70	72	6.1	ne.	5	0.11
15.....	30.18	30.09	30.17	70	76	72	69	77	67	74	6.2	ne.	4	0.05
16.....	30.18	30.11	30.16	70	77	72	67	79	66	77	6.7	ne., s.	3.0	0.28
17.....	30.13	30.05	30.13	64	76	68	64	81	70	87	6.5	n., s.	1	0.03
18.....	30.11	30.04	30.11	64	76	70	63	79	75	85	6.8	n., s.	1.0	0.00
19.....	30.12	30.05	30.08	67	76	72	66	77	72	77	6.7	s., e.	1	0.06
20.....	30.10	30.00	30.06	68	73	68	68	77	77	89	6.6	n., ne.	1.4	0.01
21.....	30.12	30.04	30.11	67	72	68	66	73	79	67	5.9	n., ne.	4.6	0.05
22.....	30.16	30.09	30.16	67	70	66	65	73	55	55	4.2	n., ne.	5.3	0.00
23.....	30.11	30.02	30.06	65	73	67	65	73	58	66	4.6	n.	3	0.00
24.....	29.98	29.90	29.99	64	70	62	63	75	63	85	5.2	n., w.	1	0.00
25.....	29.99	29.92	30.04	58	72	62	56	75	63	79	5.0	n.w., s.w.	1	0.03
26.....	30.04	29.98	30.04	62	72	68	60	75	69	71	5.6	s.w., e.	2	0.03
27.....	30.07	30.03	30.13	65	75	69	62	76	65	64	5.4	ne.	3	0.03
28.....	30.16	30.10	30.18	65	75	70	64	77	69	68	5.7	ne.	4	0.01
29.....	30.22	30.14	30.23	68	75	71	66	78	57	62	5.5	ne.	3	0.00
30.....	30.22	30.14	30.22	69	72	69	68	77	69	75	5.7	ne.	3	0.00
31.....	30.20	30.10	30.16	69	75	71	66	77	65	66	5.7	ne.	3	0.06
30-156.....	30.156	30.154	30.154	67.6	74.1	69.5	66.1	76.1	68.0	72.4	5.8			2.91

The barometer is corrected for temperature and reduced to sea level, but the gravity correction, —0.06, is still to be applied.

The absolute humidity is expressed in grains of water, per cubic foot, and is the average of four observations.

The rain is measured at 6 p. m., daily.

NOTE.—This table was received too late to be quoted in the chapter on "Atmospheric pressure."

TORNADO CLOUD OF MARCH 4, 1894.

Dr. J. C. Neal, Director of the Experiment Station at Stillwater, Okla., and formerly resident first in Indiana and afterward in Florida, states that he desires to—

Call attention to a peculiar cloud formation that I have noted for some years as prognostic of these dreadful storms, and that I think may be relied upon as invariably present from thirty minutes to two hours before the tornado.

The peculiar cloud is characterized by ball-like masses of a light gray or white color, often in long lines on a darker background or in clumps, often three or more side by side, the under side circular, the upper indefinite or shading into the main cloud. At times this gives it the appearance of having scallops, or a shell-like edge, when the tufts are at the lower margin of the cloud. An hour before the terrible tornado of April 25, 1893 (near Stillwater, Okla.), these tufts covered the sky, arranged in long lines, the under side perfectly round, the upper streaming out like cotton balls partially unwound.

With every tornado that has visited this section, or that has occurred within 150 miles of Stillwater, this phenomenon has been seen for the last four years, and in Indiana I have seen it for thirty years, so that it has the elements of constancy.

As it is impracticable to republish, in this REVIEW, the diagram that accompanied the textual description of Dr. Neal, it may be described as follows: This sketch shows the appearance of a distant tornado whirl and of the under surface of the clouds as seen between 4 and 5 p. m., seventy-fifth meridian time, March 4, 1894, from a point near Stillwater, Okla. The observer is looking toward the east and a tornado is in progress some distance away in the center of the field of the sketch. The wind at the observer's station is from the southwest, at a rate of from 45 to 60 miles per hour. In addition to the great conical cloud reaching down toward the earth from the under surface of a general layer of clouds, the diagram shows that on either side of that whirl to the right and left, and especially on the westward, or the observer's side, the under surface of the cloud layer is thickly studded with what is known in the English cloud nomenclature as "mammiform" clouds, otherwise called mammoid, mammato-cumulus, globo-cumulus, pocky cloud, rainballs, or festooned cumulus.

A mammiform cloud is supposed to mark the central region of a comparatively small whirling mass of air, such as might, under favorable circumstances, develop into a waterspout or tornado. Such cloud formations have, hitherto, always been recorded in Europe and America in connection with northwest winds, or in the narrow border line where southwest winds are about to be replaced by northwest winds. It is, however, remarkable that Dr. Neal has recorded a case in which southwest winds and mammiform clouds were prevailing on the west side of a tornado, as this is contrary to the ordinary distribution of winds and clouds around a cyclonic whirl.

In a subsequent letter Dr. Neal states:

From 2 p. m. (seventy-fifth meridian time), March 4, the wind blew a steady gale from 45 to 60 miles per hour until after 8 p. m.

Rain, with hail and sleet, fell from 5 p. m. till nearly 11. I first noted the "mammiform" (mammoid?) clouds about 1.30 p. m. and called the attention of some of my staff to the peculiar look, and told them that these clouds meant mischief. At 4 p. m., the appearance was as shown in the sketch; the nearest point of the storm was 4 miles. The wind at no time was from the northwest that night. Later on, about 9 p. m., as you will see by the inclosed clipping, another tornado began near Tecumseh, Okla. [100 miles south of Stillwater], which reminds one of the storm of April 25, 1893, when two tornadoes passed over this territory, one passing 7 miles south of Stillwater, the other, later on, passing near Moore and Norman.

I shall make these storms an especial study this year, but I am convinced that these peculiar storm clouds are a sure sign of tornadoes, and that in some way, this information should have the widest circulation possible in the storm belt.

You will see that in all these instances the storms passed to the eastward of a line drawn north and south of Stillwater. I hope to get photographs of some of these "whirls" if they come my way, which, however, I do not care to investigate at too close a range.

The newspaper clipping above referred to is an extract from the "Tecumseh Herald" of March 10, 1894, according

to which, on Sunday evening, March 4, about 8 p. m., a black cloud approached Tecumseh from the west and at a point 1 mile north of the town:

A small twister, in the shape of a funnel, dipped to the ground and did some damage. It then proceeded northeasterly, and another funnel-shaped cloud came up from the west and the two met a short distance northeast of Shawnee, and much damage was done at a point about 9 miles northeast of Tecumseh.

THE METEOR OF MARCH 27 IN IOWA.

A bright meteor of the largest size and brightness passed from south to north, or possibly from southeast to northwest, about 8.15 p. m., central, or 9.15 p. m., eastern, time, on March 27, over the eastern portion of Iowa. The following is an abstract of the reports that have been received:

Iowa City.—The snow was falling, and on examination it was found that there was a layer of dust which was supposed to have come from the meteor. Amana.—At 8.15 p. m., central time, a large meteor passed from southeast to northwest, and a few minutes later the windows rattled with the report of an explosion. Marengo (11 miles west of Amana).—The light was as bright as daylight. The meteor passed overhead about 8.20 p. m., central time; two distinct detonations were heard; snow had begun to fall at 7.45 and continued all night. At a place 8 miles northwest of Marengo the ground was covered with a black dust that was mixed with the snow, and at Marengo itself there was also a layer of snow that when melted gave a dark liquid; the director of the Iowa State Weather Service obtained a sediment of fine sand of a brown ashy hue, apparently a mixture of silica and iron. Belle Plaine.—A brilliant meteor passed over us; snow was falling at the time mixed with fine dust, supposed to have come from the meteor. Cedar Rapids.—The meteor was seen. Monticello.—8.15 p. m., the weather was cloudy, but the meteor made it as bright as day. Postville.—The flash of the meteor was seen about 8 p. m., and afterward heard a low distant rumble like thunder.

Postville is about 63 miles north of Iowa City; Belle Plaine is about 25 miles west-northwest and Monticello about 30 miles north-northeast of Iowa City; the other stations are between these limits. The length of time that elapsed between the light and the sound, namely, a few minutes at Amana, shows that the meteor must have been at a considerable height, since sound travels at the rate of about 12 miles a minute and would first reach the observer from that point of the meteor's path that was nearest to him. The hypothesis that the dust that discolored the snow throughout this region came from the meteor is to be offset by the consideration that if an ounce of such dust could be gathered from a square rod of snow, as seems to have been the case, then the resulting size of the meteor that would thus cover a region 25 miles square would necessarily be about 1,200 tons, which is, of course, entirely out of the question, as very few meteors have ever exceeded a ton, and the brightest meteors are oftentimes stony masses of much smaller weight than this. During the afternoon and evening of the 27th a strong southerly wind, with clouds of dust, prevailed over Arkansas, Oklahoma, Missouri, Kansas, and parts of Iowa and sufficiently accounts for the dusty snow that was precipitated on the front of the cold wave that was then advancing from South Dakota into Kansas and Iowa.

OBSERVATIONS BY W. B. FEATHERSTONE, OF SAN FRANCISCO, CAL.

(1) *At sea*.—Sailing from San Francisco, Cal., September 18, 1893, we encountered northwesterly winds until October 1, with slowly rising barometer. The barometer was highest September 30, 1 a. m. (30.58 inches), in N. 43° 32', W. 137°, and was unusually low on October 6, 10, 14, and 16, as follows:

October 6, 11 a. m., N. 48° 50', W. 147° 20', barometer 29.20, with violent southerly gale; before this the direction of the wind was variable and afterward from the west-northwest. The rainfall on the 5th was from 6 to 12 p. m., amounting to 0.10 or 0.20 of an inch.

October 10, 9 a. m., N. 52° 15', W. 148°, barometer 29.00, wind half a gale from the north; before this it was from the northeast and afterward from west-northwest. Rain all day, total amount a trace.

October 14, 8 p. m., N. 53° 30', W. 157° 40', barometer 29.10, moderate gale from south-southwest; before this it was from the south-southeast and afterward from west-southwest. Rainfall at 4 p. m., a trace.

October 16, 11 a. m., N. 54° 40', W. 160°, barometer 29.10, strong wind from north-northwest; before this it was from the north and afterward from northwest. Rainfall during the previous night, one inch of snow.

(2) *On Unga Island, Alaska, at the Camp of the Apollo Mining Company, half a mile west of Delarof Harbor (about N. 55° 10', W. 160° 30').*—November 2, 2.16 p. m.: A medium loud rumble of thunder is followed immediately by hail from west-southwest (magnetic). 2.19 p. m.: A faint flash of lightning is followed in two or three seconds by a lighter peal than before and a third light rumble about a minute later. Wind had been southwest to westerly during morning, with a clear sky, occasionally broken by nimbus, but no shower. It clouded dark and suddenly shortly after 2 p. m., and hail-rain fell till 4 p. m. in spasmodic showers like an eastern thunderstorm. This seems to be the only thunder ever heard on the island by any of the residents, some of them having lived there fifteen or twenty years. A few of the natives had been told of thunder during the Russian times but never heard any. Capt. J. W. Lenard tells me that he witnessed a genuine thunderstorm in Twelve Fathom Straits, off Simeonof Islands, in April, 1877, and that it was the only other one he ever saw or heard of in this part of the world.

November 13: There are about 20 inches of snow on the hills and in the more exposed valleys, and but 3 or 4 inches in the more sheltered parts, the rest having fallen as rain.

November 14: A gale set in from the southeast late in the afternoon, and increased to the violence of a hurricane during the night. The wind was about east or east-southeast (magnetic) during the strongest of the blow. 1.22 inches of rain fell, and the company's dam, just completed, was carried away. All the snow was melted save a few very small patches.

November 19: Obtained a view of the neighboring islands and mainland and saw that the snow had melted there also, and that the recent light snow (17th and 18th) had fallen only on parts of the other islands, while it nearly covered Unga.

1894, January 17 (perhaps 16): A light shock of earthquake at 3.50 a. m.; did not feel it myself; the only one I heard of during my stay.

February 22, 7.30 p. m.: The northern sky is very bright, and from here (Unga town) I see the top of a band of auroral light which, perhaps, rests on the horizon and extends at least 100° along the northern horizon (my view is restricted by hills which rise about 10°). Its outline is slightly curved, as it is 20° wide in the middle and but about 10° at the ends, where it gradually diffuses. 11 p. m.: The arch is not visible, but the northern sky is still very bright, even aside from the moon, which is now rising.

February 23, 4.30 a. m.: Parties going from town to camp say there was a momentary bright flash about this time. 7.30 p. m.: Walking from town to camp I see a faint hazy light slanting from the horizon at south 80° west (true) toward a little below Jupiter. It is triangular in form and perhaps 15° wide at the base, and extends about three-fourths of the distance to Jupiter and the Pleiades; its length, therefore, is about 40°. Its northern boundary seems a little better defined than the southern, but the whole is so very faint and diffuse that I can not set its limits within 5°. But for this, the western sky is scarcely brighter than the eastern (twilight having about ended), but the northern sky is very bright owing, doubtless, to auroral light. At Camp, 8.45 p. m.: Several streamers rise above a range of hills in the north and appear to radiate from the northern horizon. The positions (at 15° high) are, roughly, as follows: one 3° wide at 15° west (magnetic), another 2° wide at 5° west, and one 5° wide at 20° east, also several smaller ones. They kept varying in length and brightness, and by 9 p. m. have given way to a general glow. 9.15 p. m.: New streaks have appeared in different positions, and are smaller, brighter, and more numerous (8 or more). Most noticeable are the 5° streak seen before, just east of the radiating point, and another a little farther west of it and smaller. These are about 10° apart at 20° above the horizon and appear to radiate from a point on or below the horizon at 30° or 35° east of (true) north. The eastern edge of each streamer is better defined than the western. The changes are not very rapid and can all be followed by observing three or four times a minute. The longest streaks are traceable to a height of 40° or 45°. 10 p. m.: The northern sky is very much darker and no streamers apparent. A curious feature of these streaks was that the sharpest and brightest edge of each seemed to rise from some sharp irregularity in the outline of the range of hills which intercepted my view to the north. The difference in definition of the two edges may, then, have been an illusion. It is interesting to note that this, the only display seen here during the winter, nearly coincides with the meridian passage of a large sun spot, visible to the naked eye.

METEOROLOGICAL TABLES.

[Prepared by the Division of Records and Meteorological Data.]

Table I gives, for 140 Weather Bureau stations making two observations daily and for 10 others making only the 8 p. m. observation, the data ordinarily needed for climatological studies, viz, the monthly mean pressure, the monthly means and extremes of temperature, the average conditions as to moisture, cloudiness, movement of the wind, and the departures from normals in the case of pressure, temperature, and precipitation.

The stations are arranged in geographical or climatological divisions, for each of which the mean temperature and average precipitation for the month are also given, together with their departures from normal values.

Generally the headings of the several columns are sufficiently explicit as to the data underneath.

The mean pressure is based on the 8 a. m. and 8 p. m. simultaneous observations. Mean values thus computed differ from the mean of the 24 hourly readings by amounts varying from zero to 0.02 of an inch; the departures east of the ninetyth meridian are generally above the mean of 24 hourly readings and those west of that meridian are generally below. A comparison for each individual station can readily be made in connection with the data given in Table VI.

The pressures have been reduced to sea level by the empirical method published by Prof. H. A. Hazen in Signal Service Professional Paper No. VI, which, however, has been further modified for a few special stations.

The mean temperature of the dew point and the mean relative humidity are based on daily observations of the whirled psychrometer at 8 a. m and 8 p. m.

The maximum wind velocities given in the table are the velocities as read from the sheets of the register for any 5-minute period in the 24 hours, midnight to midnight, seventy-fifth meridian time.

The number of clear and cloudy days and the average cloudiness are based upon numerous personal estimates by the observer during the daytime and do not relate to the nighttime.

When these personal estimates give from 0 to 3 cloudiness, on a scale of zero to ten (0—10), the day is classed as clear; 4 to 7, partly cloudy; and 8 to 10, cloudy.

Table II gives, for about 2,200 stations occupied by voluntary observers, the extreme maximum and minimum temperatures, the mean temperature deduced from the average of all the daily maxima, and minima, or other readings, as indicated by the numeral following the name of station; and the total monthly precipitation.

For the sake of uniformity the monthly mean temperature has been deduced from readings of self-registering maximum and minimum thermometers whenever practicable. Formerly the means obtained by the use of observations at 7 a. m., 2 and 9 p. m. were printed in this table, whenever given, in preference to those deduced from the daily extremes.

These stations are arranged alphabetically by States, and their reports are generally received through the co-operation of the respective State Weather Services. The voluntary stations in the Republic of Mexico and those in the West Indies are included in this list for convenience of tabulation.

Table III gives, for about 30 Canadian stations, the mean pressure, mean temperature, total precipitation, prevailing wind, and the respective departures from normal values. Reports from Newfoundland and the Bermudas are included in this table for convenience of tabulation.

The mean pressures and temperatures here given are based

upon observations made simultaneously for telegraphic purposes at 8 a. m. and 8 p. m., seventy-fifth meridian time; the pressures have been reduced to sea level by the Weather Bureau method and, therefore, differ slightly from those reduced by the method employed by the Canadian Meteorological Service.

Table IV gives for 36 stations the percentages of hourly sunshine as derived from the automatic records made by two essentially different types of instruments, designated, respectively, as the thermometric recorder and the photographic recorder. The kind of instrument used at each station is indicated in the table by the letter T or P in the column following the name of the station.

The thermometric recorder operates on the principle of a Leslie differential air thermometer, one of the bulbs being blackened. It is fully described in the "American Meteorological Journal," Vol. ix, pp. 345-349. The record is produced electrically. Whenever the intensity of the sunshine surpasses a certain minimum limit and the heating action on the blackened thermometric bulb is sufficient to cause a mercurial column to rise above the upper of two platinum wires the recorder will be put in electrical communication with the register. By means of the clock driving the record sheet the electrical circuit is closed momentarily once each minute, causing a succession of minute marks on the record sheet. The intensity of sunshine above this limit is not recorded. The instrument is adjusted by trial and observation so that a record will just be made when the cloudiness is not sufficient to quite obscure the disk of the sun. Denser cloudiness than this, so that the exact form of the sun's disk can not be seen with the unaided eye, will cause an interruption of the record.

The photographic recorder operates on the principle of Jordan's recorder. The record sheets for this instrument are sensitized each month with the ordinary blue-print solution, and are generally used only for a period of fifteen days, a new sheet being then introduced, but the instrument can be used for a whole month's record without changing the sheets.

Neither of these instruments will record satisfactorily the duration of the sunshine for about one hour after sunrise and one hour before sunset and, on this account, it has been considered necessary to apply to the recorded hours of sunshine what has been designated a "twilight correction." The amount of this correction is found from a table of the time of sunrise and sunset, noting, in connection therewith, the time of beginning and ending of sunshine on the automatic record. This correction is applied when we know, by personal observation, the comparative clearness of the sky at the time of sunrise or sunset, as the case may be.

Although the action of the thermometric recorder is based on the heating effect of the sun's rays, while that of the photographic recorder is based on the actinic effect, it is found there is not a very great difference between the two instruments. In general, however, the photographic recorder does not give such good results at stations where rain is more or less frequent and with comparatively high relative humidities, since under these conditions the sensitized paper deteriorates.

Although the thermometric recorders are regulated by standard eastern time, and the photographic recorders by a sun dial or local apparent time, yet the readings from the record sheets are adjusted to local mean time. The last column gives the percentage of sunshine deduced by taking

the complement of the local observer's estimate of cloudiness, which latter is published in Table I.

Table V gives for 79 stations the mean hourly temperatures deduced from thermographs of the well-known pattern manufactured by Richard Bros., Paris, described and figured in the report of the Chief of the Weather Bureau, 1891-'92, p. 29. These instruments are placed in the standard shelter with other thermometers, and are checked twice daily, for time errors and for agreement with the standard whirled thermometer.

In transcribing the hourly values, the readings of the dry-bulb thermometer of the whirled psychrometer at 8 a. m. and 8 p. m. are adopted as the standard of reference, and these standard readings are given in the appropriate columns of Table V. Corrections for intermediate hours, interpolated from the known differences at 8 a. m. and 8 p. m., are applied to the curve throughout the twenty-four hours, thus making it conform as closely as practicable to the indications of the standard mercurial thermometer. The averages given in this table are, therefore, those of the standard dry thermometer at 8 a. m. and 8 p. m., and the corrected thermograph reading for intermediate hours.

In general the magnitude of the corrections applied is about 1° Fahrenheit, although a number of instruments accord with the standard dry thermometer within less than a degree.

As has been noted elsewhere, the greatest differences are those between the daily extremes registered by thermographs and by standard self-registering maximum and minimum thermometers, respectively.

Table VI gives for 68 stations the mean hourly pressures (seventy-fifth meridian time) as automatically registered by barographs of the pattern manufactured by Richard Bros., Paris, except for Washington, D. C., where Foreman's barograph is in use. Both instruments are described in the Report of the Chief of the Weather Bureau for 1891-'92, pp. 26 and 30.

The readings of the mercurial barometer at 8 a. m. and 8 p. m., seventy-fifth meridian time, corrected for temperature and instrumental error, are used as a means of checking and correcting the barograph curve, in the same manner as described in the table of temperature means, and are those given in this table.

The corrections applied to the individual hourly barograph readings vary in magnitude. The average is about 0.02 of an inch, while in extreme cases it may be 0.06 or 0.08 of an inch, depending somewhat on the individual skill of the observer in keeping the instrument in adjustment.

The means have not been reduced to sea level, neither has a correction to reduce to standard gravity been applied.

Although the mean pressures are given in this table to the nearest thousandth of an inch, yet it is probable that these figures still need appreciable systematic corrections, therefore, as in the case of so many other similar European series, caution should be exercised in using them for the investigation of diurnal periodicities of pressure. The adopted process of reduction to the standard mercurial barometer prevents the accumulation of any progressive error, whether due to the time scale or to the vacuum box, but does not inform us of any periodic errors that may have occurred within the 12-hour periods. On this latter point we have only the little knowledge that is given to us by a general investigation into the effect of temperature on these aneroids. In this respect Prof. Marvin's experiments have shown that, although the manufacturer has introduced a compensation for temperature (presumably by introducing some air into the vacuum box), yet this result has not always been per-

fectly satisfactory. Several aneroids have been found to show higher pressures when the instrumental temperature rises, while others do the reverse. In a number of cases a rise of 10° F., in the instrumental temperature produces a fall of 0.010 or 0.015 of an inch in the recorded pressure.

In general, it is safe to assume that any one of the Richard barographs at Weather Bureau stations is liable to a temperature correction of this amount, although the average of several instruments would undoubtedly be much smaller. Since the highest temperature, and, therefore, the largest plus or minus correction for temperature, generally occurs some time after the 8 a. m. reading, and *vice versa*, the lowest temperature with the largest minus or plus correction occurs before the 8 a. m. reading; therefore, there is introduced into every daily barograph record an error that will be either positive between 8 p. m. and 8 a. m., and negative between 8 a. m. and 8 p. m., or *vice versa*. The average amount of the maximum value of this error for a month, varying as it does with the temperature of the room in which the aneroid is kept, may easily amount in the winter season to 0.02 of an inch, but when station barometers are located in large buildings of uniform temperature the limit will diminish. It is evident, therefore, that these hourly means can not be used for determining by the harmonic analysis the shorter and smaller periodicities, although they sometimes give the semi-amplitude of the principal simple daily component to within 0.01 of an inch, or less. To this extent, therefore, these may be cautiously used in the study of both the geographical and chronological distribution of this first component, a study whose importance undoubtedly warrants the preparation and publication of this table from month to month. Some of the results of such studies will be published in subsequent numbers of this REVIEW.

Table VII gives for 142 stations the arithmetical means of the hourly movements of the wind ending with the respective hours, as registered automatically by the Robinson anemometer, in conjunction with an electrical recording mechanism, described and illustrated in the Report of the Chief of the Weather Bureau, 1891-'92, p. 19. No corrections have been applied to reduce the registered velocities to true velocities.

In studying the diurnal variations of wind movement, the following facts should be kept in mind. In graduating the dials of the various sizes of Robinson anemometers, it has been assumed by the makers that the centers of the cups move only one-third as fast as the wind, although numerous experiments have demonstrated that cups and arms of various proportions require different formulæ and tables of reduction even in perfectly steady motion. Prof. Marvin has further shown that for ordinary gusty winds, when the anemometer cups rapidly vary their rate of rotation, the moment of inertia of the revolving parts is a most important factor. The instruments having the least inertia record most truly, and those having large inertia exceed these in proportion as the gusts are stronger, consequently, the anemometer records are liable to be too large in the gusty winds of the daytime as compared with the more steady winds of nighttime. No correction for this inertia error has been determined, nor can be, unless we have simultaneous records with two anemometers having different moments of inertia; therefore, the apparent diurnal variations of wind velocity include a slight inertia error which is probably periodic in character between the winds of daytime and nighttime.

While we must regard the gustiness of the ordinary wind, that is, its sudden and momentary fluctuations of velocity, as highly variable, yet in practical anemometry we can not do more than make an average allowance for its effects upon an anemometer.

For the ordinary gusty winds of the free atmosphere Prof.

Marvin adopts the following equation expressing the relation between the motion of the cups and the velocity of the wind at any moment:

$$\text{Log. } V = 0.509 + 0.9012 \log. v;$$

where V is velocity of wind in miles per hour and v is the linear velocity (also in miles per hour) of the cup centers. This equation applies strictly to anemometers that have 4-inch hemispherical brass cups on arms 6.72 inches long, whose revolving parts weigh about 590 grams (22 ounces) and have a moment of inertia of about 50,000 C. G. S. units.

This equation has been deduced from comparative observations in the open air of anemometers whose behavior in steady velocities on the whirling machine had been previously studied. The recognition thus given the important effects of inertia enables us to say that by applying this formula, or the following equivalent table, we partly annul the influence of the inertia of brass anemometers used by the Weather Bureau.

The following table gives the corrected velocities corresponding to observed velocities up to 90 miles per hour. The tabular values corresponding to indicated velocities greater than 60 miles per hour are uncertain, as direct experiments were not made at the higher velocity:

Wind velocities, as indicated by Weather Bureau anemometer, converted to true velocities (in miles per hour).

Indicated velocity.	0	1	2	3	4	5	6	7	8	9
0.....	9.6	10.4	11.3	12.1	12.9	13.8	14.6	15.4	16.2	17.0
10.....	17.8	18.6	19.4	20.2	21.0	21.8	22.6	23.4	24.2	24.9
20.....	25.7	26.5	27.3	28.0	28.8	29.6	30.3	31.1	31.8	32.6
30.....	33.3	34.1	34.8	35.6	36.3	37.1	37.8	38.5	39.3	40.0
40.....	40.8	41.5	42.2	43.0	43.7	44.4	45.1	45.9	46.6	47.3
50.....	48.0	48.7	49.4	50.2	50.9	51.6	52.3	53.0	53.8	54.5
60.....	55.2	55.9	56.6	57.3	58.0	58.7	59.4	60.1	60.8	61.5
70.....	62.2	62.9	63.6	64.3	65.0	65.8	66.4	67.1	67.8	68.5
80.....	69.2	.....	.....	.....	.....	.....	.....	.....	.....	.....
90.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Table VIII gives the resultant movements of the winds for 68 stations of self-registration as deduced from the continuous record for every hour of the month. The contents of the columns are as follows:

Column 1—the name and number of the station, the latter

being the same as in tables I and IX for convenience of reference. Columns 2 and 3—the direction and duration of the prevailing wind, viz, that observed most frequently. Columns 4 and 5—the total movement in all directions for the whole month and the average hourly movement corresponding thereto. Column 6—the resultant direction, assuming the wind to have always a uniform velocity. Column 7—the duration in hours of this resultant direction, considered as a wind that has blown with the average velocity. Column 8—the approximate average hourly velocity in this resultant direction, found by dividing the resultant movement of column 10 by the resultant duration of column 7. Column 9—the direction of the resultant movement, computed by using the miles actually traveled each hour, as read from the registers. Column 10—the amount of the resultant movement in miles. Column 11—the azimuth of the resultant movement minus the azimuth of the resultant direction; these azimuths are counted around the circle from zero at the south through 90° at the west, and if the azimuth of the resultant movement is greater than that of the resultant direction, the difference in column 11 is called positive; the azimuth of the movement is equal to that of the direction plus the positive, or minus the negative differences. Column 12—the ratio of the resultant movement in column 10 divided by the total movement in column 4; this ratio would be unity in the ideal case of wind blowing from one direction only, but would be zero in the ideal case of equal opposing winds.

Table IX gives for 140 stations, or all that make observations at 8 a. m. and 8 p. m. (seventy-fifth meridian time), the four component directions and the resultant directions based on these two observations only and without considering the velocity of the wind in miles. The total movement for the whole month, as read from the dial of the Robinson anemometer, is given for each station in Table I. By adding the four components for the stations comprised in each geographical division one may obtain the average resultant direction for that region. From these resultant directions one may pass to the resultant movement, at least approximately, by applying the average corrections indicated by column 11 of Table VIII.

TABLE I.—Climatological data for Weather Bureau Stations, March, 1894.

Districts and stations.	Elevation above sea-level, feet.	Length of record, years.	Pressure, in inches.			Temperature of the air, in degrees Fahrenheit.					Humidity and precipitation.					Wind.				Mean temperature data since opening of station.											
			Mean pressure, 8 a. m. and 8 p. m. + z.	Mean reduced.	Departure from normal.	Mean max. and min. + z.	Departure from normal.	Maximum.	Date.	Mean minimum.	Greatest daily range.	Mean temperature of the day-point.	Mean relative humidity, per cent.	Precipitation, in inches.	Departure from normal.	Days with .01 or more.	Total movement, miles.	Prevailing direction.	Maximum velocity.	Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness, tenths.	Highest for month.	Year.	Lowest for month.	Year.				
New England.																															
Eastport.....	76	21	29.93	30.02	+ .14	30.1	5.9	51	19	38	13	26	29	20	25	73	1.69	2.6	14	8,173	sw.	42	nw.	19	4	15	6.5	33.4	1885	22.8	1885
Portland.....	103	23	29.91	30.02	+ .10	33.4	4.8	71	19	44	14	27	30	31	30	78	1.97	1.4	11	5,699	sw.	23	7	10	8	5.5	38.8	1878	23.2	1872	
Northfield.....	872	8	29.08	30.06	+ .08	34.0	5.7	66	19	43	5	27	25	25	31	60	1.06	2.3	13	8,177	sw.	39	19	7	12	6	5.4	34.0	1894	21.1	1887
Boston.....	125	24	29.93	30.07	+ .12	42.5	7.9	70	19	40	5	27	35	25	31	60	1.01	3.4	13	8,964	w.	36	16	6	17	8	5.9	42.5	1894	26.8	1872
Nantucket.....	14	8	30.08	30.09	+ .14	39.3	4.9	53	7	44	22	27	34	16	34	81	1.81	3.0	12	11,216	sw.	47	14	8	18	5	5.2	40.5	1878	31.6	1888
Woods Holl.....	16	10	30.08	30.09	+ .14	39.3	4.9	53	7	44	22	27	34	16	34	81	2.28	2.2	11	10,553	sw.	42	14	11	15	5	5.1	39.8	1894	29.8	1885
Vineyard Haven.....	8	10	30.08	30.09	+ .14	39.3	4.9	53	7	44	22	27	34	16	34	81	2.15	1.9	10	10,553	sw.	42	14	11	15	5	5.1	39.8	1894	29.8	1885
Block Island.....	27	14	30.07	30.10	+ .14	39.8	4.8	58	22	45	22	27	32	24	34	83	1.97	2.4	13	10,553	sw.	42	14	11	15	5	5.1	39.8	1894	29.8	1885
Narragansett Pier.....	107	12	29.97	30.09	+ .10	41.4	7.0	65	19	50	15	27	33	20	32	78	1.15	3.0	9	6,209	sw.	39	14	5	21	5	6.0	43.4	1878	26.9	1885
New Haven.....	107	22	29.97	30.09	+ .10	41.4	7.0	65	19	50	15	27	33	20	32	78	2.07	2.0	17	5,606	nw.	32	14	13	8	10	5.3	41.5	1878	26.7	1872
New London.....	45	24	30.07	30.12	+ .14	47.4	6.8	73	22	48	18	27	33	23	32	76	0.85	2.1	14	6,764	sw.	33	14	7	14	10	5.9	39.8	1894	23.1	1885
Mid. Atlantic States.																															
Albany.....	85	21	30.00	30.10	+ .11	39.8	6.1	71	19	48	17	27	31	26	30	73	1.69	2.4	12	7,745	nw.	42	14	8	13	10	5.4	44.5	1894	28.9	1872
New York, N. Y.....	185	24	29.91	30.11	+ .11	44.5	7.3	69	19	53	20	27	36	31	34	72	1.30	2.0	11	5,571	w.	36	14	12	9	9	4.5	44.1	1894	33.0	1892
Harrisburg.....	377	6	29.71	30.13	+ .13	44.1	8.0	75	22	53	19	27	36	30	35	73	1.45	1.7	10	7,620	nw.	36	14	12	8	11	5.3	48.6	1871	30.8	1885
Philadelphia.....	117	24	30.00	30.12	+ .12	47.0	6.1	86	22	56	21	27	38	29	35	69	1.39	2.5	11	8,607	sw.	42	14	11	7	13	5.4	44.0	1894	31.4	1885
Atlantic City.....	53	21	30.07	30.12	+ .12	44.0	6.2	77	19	53	18	1	33	35	35	82	1.74	2.0	12	11,216	sw.	47	14	8	18	5	5.2	40.5	1878	31.6	1888
New Brunswick.....	179	24	29.92	30.12	+ .09	48.2	6.1	81	22	57	20	27	39	35	34	63	1.19	2.9	8	5,872	nw.	37	14	11	7	4	4.3	49.1	1878	35.3	1885
Baltimore.....	112	24	30.02	30.14	+ .10	48.5	7.1	83	22	58	20	27	39	35	35	66	0.98	3.2	7	5,504	nw.	37	14	11	6	4	4.0	49.4	1878	34.5	1885
Washington, D. C.....	112	24	30.02	30.14	+ .10	48.5	7.1	83	22	58	20	27	39	35	35	66	2.77	2.6	12	5,504	sw.	37	14	11	7	12	5.2	49.4	1878	39.9	1885
Cape Henry.....	685	20	29.41	30.16	+ .11	51.9	6.5	86	23	59	19	28	40	37	40	72	0.95	2.9	8	3,657	nw.	26	14	11	5	5	5.3	48.8	1878	39.0	1885
Lynchburg.....	57	24	30.08	30.15	+ .11	52.5	6.5	88	22	62	24	27	43	34	44	81	2.04	1.6	11	6,028	n.	36	14	11	6	4	4.2	55.1	1871	40.8	1885
Norfolk.....	57	24	30.08	30.15	+ .11	52.5	6.5	88	22	62	24	27	43	34	44	81	2.04	1.6	11	6,028	n.	36	14	11	6	4	4.2	55.1	1871	40.8	1885
S. Atlantic States.																															
Charlotte.....	773	16	29.31	30.14	+ .09	55.6	5.8	85	22	67	20	27	46	31	40	62	1.04	3.7	8	6,061	sw.	32	14	13	4	3	3.9	56.6	1894	45.3	1885
Hatteras.....	11	14	30.15	30.16	+ .12	55.6	5.8	85	22	67	20	27	46	31	40	62	3.12	3.3	9	10,090	sw.	52	14	10	8	4	4.8	55.6	1894	44.4	1885
Kittyhawk.....	9	18	30.13	30.14	+ .10	51.8	5.3	82	23	61	31	27	44	30	45	82	2.05	3.9	11	10,237	sw.	48	14	9	8	4	4.3	53.1	1878	41.7	1885
Baleigh.....	388	8	29.73	30.16	+ .09	55.3	4.7	80	23	66	21	27	46	33	43	69	2.14	2.8	11	5,008	sw.	38	14	12	5	4	4.1	56.0	1894	45.2	1891
Southport.....	34	19	30.17	30.17	+ .12	55.3	4.7	80	23	66	21	27	46	33	43	69	2.33	1.6	10	7,097	sw.	38	14	12	5	8	3.8	58.4	1878	45.8	1885
Wilmington.....	78	24	30.08	30.17	+ .12	59.2	5.9	87	23	68	27	27	51	27	50	82	2.27	1.9	12	6,586	sw.	38	14	12	5	8	3.6	60.3	1871	48.0	1872
Charleston.....	52	24	30.14	30.18	+ .11	61.4	5.9	84	23	68	27	27	51	24	51	80	1.78	2.2	8	5,912	sw.	37	14	11	21	2	4.2	62.5	1871	52.1	1872
Columbia.....	7	24	30.07	30.20	+ .11	60.4	6.2	90	22	72	24	27	49	36	46	68	2.09	2.6	8	4,474	nw.	36	14	11	17	3	3.3	61.3	1878	49.6	1885
Augusta.....	202	23	29.97	30.19	+ .11	63.6	4.8	88	22	73	25	27	54	30	53	80	2.81	0.8	8	6,488	sw.	30	14	11	17	3	4.0	64.1	1880	53.1	1872
Savannah.....	98	24	30.06	30.19	+ .09	63.6	4.0	88	22	73	25	27	54	30	53	80	3.12	0.1	7	5,512	sw.	39	14	11	9	9	5.0	68.1	1880	57.6	1885
Jacksonville.....	43	23	30.14	30.19	+ .10	70.4	1.1	85	25	76	32	27	56	33	54	76	0.82	1.1	5	8,088	sw.	33	14	11	2	3	3.7	70.1	1894	64.8	1889
Florida Peninsula.																															
Jupiter.....	26	7	30.14	30.17	+ .07	70.1	0.1	85	25	76	32	27	56	33	54	76	0.69	1.0	5	8,088	sw.	33	14	11	2	3	3.7	70.1	1894	64.8	1889
Key West.....	32	24	30.15	30.17	+ .07	73.9	1.4	83	25	78	31	27	70	13	62	70	1.13	0.0	3	7,857	sw.	36	14	11	2	3	3.7	76.6	1874	60.4	1889
Tampa.....	36	24	30.15	30.19	+ .07	68.3	1.3	87	25	78	31	27	58	30	59	80	1.71	0.0	6	4,890	w.	26	14	11	3	3	3.6	61.0	1880	57.6	1885
Titusville.....	44	7	30.15	30.19	+ .07	67.2	1.3	88	25	76	32	27	58	27	60	82	0.64	2.4	4	10,048	sw.	40	14	11	0	2	5.7	67.2	1894	61.5	1889
Eastern Gulf States.																															
Atlanta.....	1,131	16	29.97	30.18	+ .08	56.7	5.2	82	22	67	19	27	47	34	42	66	2.99	3.2	11	7,574	nw.	35	14	16	3	4	4.0	57.0	1880	47.0	1885
Pensacola.....	56	15	30.09	30.18	+ .08	61.8	1.3	79	21	68	20	27	55	34	55	81	7.52	2.1	10	7,875	sw.	38	14	8	9	4	7.7	65.4	1880	54.8	1885
Mobile.....	57	24	30.10	30.18	+ .07	60.5	1.0	78	21	68	20	27	55	35	55	88	11.51	4.1	14	7,195	sw.	44	14	11	11	9	5.5	65.1	1882	53.5	1885
Montgomery.....	257	22	29.88	30.16	+ .07	60.6	1.3	86	21	71	25	27	50	36	48	80	4.88	1.2	11	4,864	sw.	40	14	10	14	7	5.0	62.6	1878	51.7	1885
Meridian.....	358	22	29.75	30.14	+ .08	59.0	0.8	85	20	70	23	27	48	40	50	79	5.34	0.9	9	5,837	sw.	43	14	10	14	7	4.3				
Vicksburg.....	254	23	29.83	30.14	+ .08	61.0	0.8	85	20	70	23	27	48	40	50	7															

TABLE I.—Climatological data for Weather Bureau Stations, March, 1894—Continued.

Districts and stations.	Elevation above sea level, feet.	Length of record, years.	Pressure, in inches.		Temperature of the air, in degrees Fahrenheit.							Humidity and precipitation.					Wind.				Mean temperature data since opening of station.											
			Mean pressure, 8 a. m. and 8 p. m. + 2.	Mean reduced.	Departure from normal.	Mean max. and min. + 2.	Departure from normal.	Maximum.	Date.	Mean minimum.	Date.	Greatest daily range.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches.	Departure from normal.	Days with or more.	Total movement, miles.	Prevailing direction.	Maximum velocity.		Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness, tenths.	Highest for month.	Year.	Lowest for month.	Year.			
																				Miles per hour.	Direction.											
Up. Miss. Val.—Con.																																
Davenport.....	613	23	29.33	30.00	-.06	43.4	78	17	52	6	25	35	29	33	72	1.88	0.3	8	9,320	sw.	60	sw.	10	8	15	8	5.3	48.2	1878	28.7	1877	
Des Moines.....	869	16	29.04	30.00	-.06	42.6	77	17	53	4	25	33	34	30	67	1.78	0.4	8	8,209	sw.	42	sw.	10	15	9	7	4.9	42.6	1894	28.8	1891	
Dubuque.....	651	21	29.27	29.99	-.05	41.4	78	17	53	7	25	32	34	32	73	3.06	0.8	10	5,494	sw.	34	sw.	10	9	13	9	5.6	45.4	1878	26.7	1888	
Keokuk.....	613	23	29.34	30.01	-.03	46.2	78	21	56	6	25	36	34	34	67	2.52	0.4	8	7,981	sw.	42	nw.	10	15	8	8	4.4	50.4	1878	31.1	1891	
Cairo.....	359	23	29.70	30.00	+.05	52.4	78	21	61	17	26	44	29	43	73	4.14	0.3	9	8,293	s.	44	sw.	22	11	8	8	5.0	57.6	1878	42.5	1891	
Springfield, Ill.....	644	15	29.34	30.05	-.01	46.6	77	21	56	8	25	37	31	34	68	3.09	0.5	9	9,150	s.	36	s.	10	12	11	8	4.9	46.6	1894	33.8	1891	
Hannibal.....	534	20	29.44	30.03	.....	47.4	81	21	57	12	25	38	34	34	66	1.77	0.5	5	9,442	sw.	48	s.	10	11	10	10	5.2	.....	.....	.....	.....
Saint Louis.....	571	24	29.43	30.05	-.01	51.2	84	21	61	14	26	42	37	38	66	2.69	0.1	7	10,158	se.	41	s.	10	18	5	8	3.6	53.9	1878	37.8	1872	
Missouri Valley.																																
Columbia.....	.....	.....	.....	.....	.....	50.0	84	21	63	11	26	37	41	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kansas City.....	963	6	28.98	30.03	-.04	47.8	82	17	58	12	25	37	33	34	66	2.66	0.6	6	9,025	sw.	36	sw.	10	18	7	6	3.5	45.4	1889	33.9	1891	
Springfield, Mo.....	1,356	9	28.59	30.04	-.02	50.0	82	17	60	13	26	40	32	34	62	3.62	0.3	6	9,104	se.	36	s.	4	12	11	8	4.3	50.6	1882	39.5	1891	
Topeka.....	.....	.....	.....	.....	.....	48.6	82	17	61	11	26	36	38	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Omaha.....	1,123	24	28.79	30.02	-.07	43.0	82	17	54	4	25	32	37	28	63	0.91	0.6	6	7,666	nw.	32	nw.	28	9	10	12	5.8	47.9	1878	27.6	1881	
Valentine.....	2,613	9	27.19	30.00	-.10	30.2	77	16	48	4	25	24	48	23	66	1.08	0.0	5	10,242	n.	48	nw.	21	6	16	9	6.1	44.0	1889	21.6	1891	
Sioux City.....	1,165	20	28.69	29.97	.....	39.8	82	17	51	0	25	28	40	26	66	0.64	0.0	7	10,633	nw.	42	nw.	10	11	11	9	5.2	.....	.....	.....	.....
Pierre.....	1,470	20	28.36	29.99	.....	34.1	73	16	45	5	25	24	38	23	73	1.60	0.0	7	8,534	nw.	40	n.	21	12	11	8	5.0	.....	.....	.....	.....
Huron.....	1,310	13	28.52	29.98	-.12	33.8	79	16	46	6	25	22	47	24	75	1.18	0.5	7	11,716	nw.	58	se.	14	8	12	11	6.2	36.3	1889	19.2	1888	
Northern Slope.																																
Havre.....	2,477	14	27.27	29.99	-.06	27.8	62	29	38	17	28	17	49	17	67	0.64	0.0	6	7,737	sw.	53	nw.	14	7	18	6	5.6	39.6	1885	18.0	1893	
Miles City.....	2,374	17	27.41	30.01	.....	28.6	62	16	38	3	25	20	34	22	80	4.03	3.5	12	5,374	nw.	40	n.	19	6	12	13	6.4	38.8	1878	15.8	1891
Helena.....	4,118	14	25.71	30.05	-.01	30.8	62	29	39	0	5	22	31	18	63	0.80	0.2	12	6,888	sw.	46	sw.	9	5	4	22	7.1	40.6	1885	23.2	1891	
Rapid City.....	3,880	9	26.53	30.01	-.09	33.5	62	16	44	2	25	23	48	20	65	1.18	0.2	8	9,271	n.	51	n.	22	1	20	10	6.7	39.8	1889	24.9	1888	
Cheyenne.....	6,105	24	23.88	30.07	-.01	33.2	63	12	44	4	28	22	41	20	62	0.93	0.3	7	11,419	w.	48	w.	14	7	17	7	5.2	42.1	1887	25.7	1875	
Lander.....	5,377	20	24.52	30.05	.....	32.0	61	13	44	3	22	20	43	18	62	3.29	0.0	9	4,781	w.	60	sw.	16	7	15	9	5.7	.....	.....	.....	.....
Kearney.....	2,206	20	27.64	30.03	.....	40.0	81	17	52	2	26	28	41	24	60	0.85	0.0	5	9,699	nw.	60	s.	4	9	10	9	4.9	.....	.....	.....	.....
North Platte.....	2,841	20	27.00	30.04	-.06	39.8	77	16	54	7	25	26	50	24	62	1.73	1.1	4	9,156	nw.	44	nw.	10	5	23	3	5.2	44.6	1878	26.9	1888	
Middle Slope.																																
Colorado Springs.....	6,098	15	23.91	30.03	.....	37.2	70	12	50	6	22	25	46	13	45	0.36	0.2	5	9,063	n.	66	nw.	10	8	16	7	5.0	44.2	1879	30.4	1875
Denver.....	5,287	23	24.04	30.03	-.03	40.2	71	12	52	9	25	28	46	16	41	0.70	0.2	7	6,491	sw.	36	nw.	10	19	6	12	5.1	46.0	1879	32.2	1891	
Pikes Peak.....	17	.....	.....	.....	.....	8.6	26	15	14	17	22	3	21	1	75	1.34	.....	13	25,733	w.	93	w.	30	5	13	13	6.3	16.0	1879	0.4	1875
Pueblo.....	4,734	6	25.16	30.00	.....	43.2	75	12	57	11	22	29	51	13	39	0.24	0.6	6	7,476	w.	48	n.	20	9	19	3	4.7	44.2	1889	35.8	1891
Concordia.....	1,410	9	28.49	30.02	-.09	45.8	86	17	59	7	26	33	47	28	60	0.28	1.7	2	8,342	s.	48	s.	17	16	10	5	4.0	45.8	1894	33.1	1891	
Dodge City.....	2,523	20	27.34	30.02	-.03	46.1	84	14	60	9	26	32	45	25	54	0.40	0.4	4	10,635	se.	48	nw.	10	16	13	2	3.8	48.8	1878	33.8	1891	
Wichita.....	1,366	6	28.55	30.04	.....	49.0	80	16	60	13	20	38	39	31	58	0.72	0.0	4	9,176	s.	39	n.	28	15	10	6	3.9	49.0	1894	37.8	1891
Oklahoma City.....	1,239	20	28.72	30.05	.....	52.6	83	14	64	19	26	41	34	38	65	4.79	0.0	8	8,918	s.	42	n.	10	22	5	4	2.9	.....	.....	.....	.....
Southern Slope.																																
Abilene.....	1,749	9	28.19	30.03	-.02	57.8	92	13	70	24	29	46	40	36	53	1.66	0.1	7	9,348	se.	42	nw.	28	16	13	2	3.1	59.1	1887	49.9	1891	
Amarillo.....	3,691	.....	.....	.....	.....	46.4	77	14	58	17	26	34	39	22	43	0.05	0.0	2	14,386	sw.	66	sw.	6	18	10	3	3.5	.....	.....	.....	.....
Southern Plateau.																																
El Paso.....	3,796	16	26.18	30.05	+.02	54.0	83	13	67	27	22	41	43	12	25	0.13	0.4	3	9,243	nw.	52	nw.	17	14	14	3	3.9	63.6	1879	53.9	1886	
Santa Fe.....	7,051	22	23.18	30.02	.....	39.3	76	13	50	15	5	29	38	14	40	0.41	0.2	5	5,961	sw.	42	sw.	3	19	8	4	3.7	47.5	1879	32.4	1880
Tucson.....	2,432	11	27.47	30.01	.....	54.9	86	29	70	24	5	40	43	26	44	1.17	0.2	7	6,174	se.	51	s.	3	17	5	9	4.1	65.5	1879	54.2	1880
Yuma.....	141	19	29.79	29.94	-.05	63.0	2.1	95	29	78	33	21	48	41	32	40	0.74	0.6	2	5,738	w.	54	nw.	17	19	9	3	2.6	71.8	1877	58.3	1880
Keeler.....	3,622	10	26.24	29.96	-.05	50.5	78	25	63	24	20	38	39	22	34	0.01	0.2	1	6,367	e.	60	nw.	17	17	8	6	3.6	56.5	1887	47.5	1886	
Middle Plateau.																																
Carson City.....	4,720	7	25.26	30.07	.....	42.0	62	26	53	12	3	32	40	20	43	0.97	0.3	7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Winnemucca.....	4,340	16	25.61	30.05	-.01	39.8	68	26	50	17	10	29	41	19	48	0.38	0.5	8	8,975													

TABLE II.—Meteorological record of voluntary and other co-operating observers, March, 1894.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean.			Max.	Min.	Mean.	
<i>Alabama.</i>					<i>Arizona—Cont'd.</i>				
Aleco.....	85	26	60.8		Willcox.....	80	23	45.9	0.70
Auburn.....	82	21	58.7	2.54	Yuma.....	95	42	65.7	0.00
Bermuda * ¹	84	24	59.9	5.37	<i>Arkansas.</i>				
Birmingham.....	87 ²	27	62.4	4.44	Arkadelphia.....	88	25	56.4	11.35
Brewton.....	83	25	61.2	7.88	Arkansas City.....	88	25	56.4	9.70
Carrollton * ¹	79	25	58.5	4.82	Ashdown.....	88	25	56.4	9.70
Citronelle.....	80	30	61.8	6.48	Bee Branch.....	85	19	55.2	9.20
Clairborne Landing.....					Blanchard Springs.....	85	23	57.1	9.70
Clanton.....	83	22	59.6	4.90	Brinkley.....	81	22	54.2	13.35
Cordova.....					Camden.....				
Daphne.....	85	28	61.0	4.13	Camden.....	85	24	56.5	11.87
Demopolis.....					Casaville.....	78	13	52.2	7.00
Elba * ¹	82	30	65.7	7.63	Conway.....	79	24	54.9	9.28
Eufaula.....	86	28	62.6	3.22	Cornerstone.....	76 ¹	26	55.8 ¹	14.25
Eufaula.....					Corning.....	81	19	52.6	6.61
Florence.....					Dallas.....	76 ¹	22 ¹	53.6 ¹	11.28
Florence.....	81	19	54.8	5.59	Dardanelle.....				
Fort Deposit.....	85	25	60.4	4.91	Fayetteville.....	82	15	52.2	5.66
Gadsden.....	87	20	58.0	2.72	Forrest.....	82	21	58.8	14.70
Greensboro.....	84	24	58.2	4.94	Fulton.....				
Healing Springs.....	84	23	57.6	5.18	Gaines Landing.....				
Highland Home.....	83	26	60.9	4.26	Hamburg.....	84	21	56.9	10.85
Livingston.....					Helena.....				
Lock No. 4.....					Helena.....	80	24	56.2	8.91
Madison Station.....	82	20	60.9	3.83	Hot Springs.....	86	19	54.8	10.40
Maple Grove.....	83	19	56.6	3.73	Hot Springs (near).....				
Marion.....					Keesee Ferry.....	84	14	52.8	9.17
Mount Willing.....	84	25	59.6	5.91	Kirby.....	84			10.40
Newbern.....	83	24	57.8	4.39	Lonoke.....	77	26	57.0	13.00
Newburg.....	85	25	58.6	5.31	Madding.....				
Newton.....	85	26	60.4	3.61	Mount Ida.....	83	17	52.0	11.73
Opelika.....	76	26	60.2	1.75	Mount Nebo.....	75	20	53.5	10.10
Pine Apple.....	84	25	59.3	5.85	New Gascony * ¹	76 ¹	29	55.8 ¹	14.25
Pushmataha.....	84	29	60.6	5.11	Newport.....				
Rock Mills.....	84	20	56.2	5.81	Newport.....	78	21	54.0	7.97
Scottsboro.....	81	19	55.4	4.09	Ocala.....	81	22	54.0	8.80
Selma.....					Ozark.....	83	21	55.7	8.05
Starlington * ¹	85	26	58.6	5.80	Rison.....	81	20	55.8	10.12
Sturdevant.....					Rogers.....	83	8	46.4	4.73
Talladega.....					Russellville.....	83	22	54.8	9.70
Talladega.....	86	21	58.4	4.70	Sealey.....	84	18	52.2	7.05
Talladega Falls.....					Stuttgart.....	81	25	55.8	14.33
Tuscaloosa.....	88	21	57.6	5.18	Texaskanan.....	86	26	58.2	4.33
Union.....	86 ²	26	58.6 ²	4.60	Warm Springs * ¹	80	18	52.1	5.50
Union Springs.....	87	22	59.6	3.14	Washington.....	83	24	56.1	12.27
Uniontown.....	82	25	60.0	4.61	Wigwag.....				
Valley Head.....	82	16	53.6	4.11	Winslow.....	78	13	49.0	6.68
Warrior.....					<i>California.</i>				
Wetumpka.....					Agave.....	76	26	45.5	1.53
Wilsonville.....					Agave.....	76	33	51.8	0.73
<i>Alaska.</i>					Anaheim.....	81	44	54.9	0.45
Killisnoo.....	45	10	30.8	7.70	Anderson * ¹	74	22	47.6	1.96
Metlakatla.....	54	11	34.6	8.10	Antioch.....	77	36	52.7	0.37
<i>Arizona.</i>					Aptos.....	80	30	52.1	0.92
Arisola.....	91	30	58.2	0.75	Arcata.....	63	29	46.4	8.52
Aris. Canal Co. Dam.....	89	36	61.0	1.20	Arlington Heights.....	88	29	54.2	0.48
Benson.....	90	40	66.0	0.40	Athlone.....	85	35	54.5	0.32
Bisbee * ¹	75	24	49.0	1.91	Auburn.....	84	29	51.7	0.50
Buckeye.....	95	31	61.1	0.90	Bakersfield.....	79	38	56.8	0.50
Calabasas.....	86	20	50.4	0.79	Ballast Point L. H.....				
Casa Grande.....	90	40	63.3	0.62	Barstow.....	84	24	55.1	0.65
Chiricahua Mts.....					Beaumont.....	82	31	58.6	0.35
Dragon Summit.....	72	39	53.4	0.92	Belmont.....	73	44	57.0	0.48
Dudleyville.....	86	39	53.4	1.22	Berendo.....	84	36	56.2	0.48
Eagle Pass.....					Berkeley.....	69	34	49.8	0.91
Farley's Camp.....					Bethany.....	77	31	51.7	0.33
Flagstaff.....	64	18	36.6	5.20	Bishop Creek.....	77	31	51.7	0.33
Fort Apache.....	73	24	43.3	1.07	Boca.....	70	0	53.2	0.75
Fort Bowie.....	79	24	51.2	0.67	Borden.....	82	32	54.9	0.15
Fort Grant.....	81	20	48.8	0.66	Boulder Creek.....	74	30	49.1	2.11
Fort Huachuca.....	87	16	49.0	1.12	Brentwood.....	75	38	51.0	0.25
Gila Bend.....	92	36	61.9	0.71	Brighton.....	85	32	56.2	0.31
Globe.....	81	29	53.7	0.94	Byron.....	80	31	51.2	0.32
Holbrook.....	79	16	46.0	0.16	Caliente.....	76	38	54.9	1.60
Keams Canyon.....	70	12	40.1	0.26	Calistoga.....	79	34	53.3	3.21
Maricopa.....	85	40	60.4	0.50	Campo Seco.....				
Mount Huachuca.....	81	18	49.3	1.02	C. Mendocino L. H.....				
Natural Bridge.....					Capitola.....	70	30	52.1	0.50
Navajo * ¹					Castroville.....	69	31	54.0	0.50
Nogales * ¹	78	31	57.8	1.87	Centerville.....	78	28	53.6	1.23
Oracle.....	77	25	51.4	0.67	Chico.....	82	28	53.7	1.68
Oro.....					Chino.....	82	31	51.9	0.47
Palomas.....	96	25	59.2	0.60	Cisco.....	45	10	31.4	1.05
Pantano.....	82	32	51.5	0.70	Claremont.....	81	28	53.0	1.05
Payson.....	70	15	41.0	2.00	Colegrove.....				
Peoria.....	84	35	59.2	0.63	Colfax.....	70	24	46.8	3.63
Phoenix.....	90	29	57.9	2.40	Colton.....	82	32	53.8	2.00
Phoenix.....	90	33	59.6	0.63	Colusa.....	83	30	53.2	0.80
Red Rock * ¹	84	34	61.4	2.40	Corning.....	82	34	54.0	0.85
Reymert.....	88	31	55.7	2.22	Crescent City.....	63	30	45.8	14.11
Rye.....	85	23	50.0	1.30	Crescent City L. H.....				
St. Helena R'h.....	86	22	51.4	1.16	Crofton.....	78	35	55.6	0.18
San Carlos.....	82	23	51.4	1.14	Davisville.....	78	35	51.9	0.94
San Simon.....	78	28	56.7	0.15	Deep Creek.....				
Show Low.....					Delano.....	83	32	54.9	2.60
Signal.....	87	32	56.6	0.55	Delta.....	77	32	53.4	1.02
Texas Hill.....	80	40	64.7	0.00	Dinuba.....	80	32	55.5	0.52
Tucson.....	96	26	64.2	1.10	Downey.....	90	38	56.5	0.52
Tucson.....	90	30	64.5	0.64	Dry Creek * ¹				
Walnut Grove.....					Drytown.....	76	27	49.5	1.48
Walnut Ranch * ¹	78	20	46.4	2.46	Dunnigan.....	78	34	51.1	0.93
Whipple Barracks.....	79	—	41.9	0.88	Dunsmuir.....	77	21	45.5	0.05
Wilcox.....					East Brother L. H.....				

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
California—Cont'd.					California—Cont'd.				
Edgewood**	74	18	42.9	1.83	New Almaden**	75	34	52.3	0.88
Edmonton**	83	12	35.1	7.08	Newark**	68	34	54.7	0.67
Eldorado**	81	32	51.4	2.25	Newcastle a†	76	27	49.2	1.49
Elmira**	85	35	53.3	0.97	Newcastle b**	78	28	48.7	0.59
El Verano**	75	35	51.6	2.40	Newhall**	89	30	53.6	0.62
Emigrant Gap**	86	50	12	33.8	Newman**	75	32	54.1	0.00
Espartero**	80	37	51.1	0.42	Niles**	68	32	50.2	1.25
Evergreen				1.21	Nordhoff†	83	26	51.0	0.29
Exeter**	95	33	66.2	1.11	Norwalk**	80	34	52.1	0.43
Fall Brook**	83	30	49.8	1.35	Oakdale a**	79	27	51.3	0.54
Farmington**	75	39	51.6	0.13	Oakdale b**	78	26	51.8	0.54
Felton**	86	28	55.1	0.60	Oakland a	72	34	51.6	0.7
Fernando**	80	29	51.3	0.75	Oakland b**	64	38	50.8	0.75
Florence**	80	38	59.6	0.57	Ogden**	99	44	66.6	0.26
Florida**	84	31	50.2	0.52	Oleta**	72	28	46.6	1.11
Folsom City a**	85	35	54.8	1.22	Ontario a**	86	36	57.6	0.80
Folsom City b**	82	33	53.8	1.13	Ontario b	92	31	55.4	0.75
Fort Ross				4.25	Orangevale†	79	30	51.8	1.47
Fresno**	85	34	55.9	0.25	Orland**	78	40	53.0	0.40
Fruto**	75	35	54.1	0.38	Oroville a**	77	34	55.2	0.95
Galt**	80	37	52.4	0.66	Oroville b	72	31	52.3	0.95
Georgetown†	70	20	46.2	4.74	Pajaro**	69	36	52.0	0.40
Gilroy**	80	30	51.3	0.66	Palermo†	78	30	51.5	0.79
Girard**	65	25	43.5	3.05	Palms Springs**	98	38	62.6	0.00
Glendora				1.09	Paso Robles a**	85	28	51.4	0.22
Glen Ellen**	76	29	55.5	2.46	Paso Robles b	84	24	49.9	0.22
Gorman Station†				1.37	Petaluma**	73	37	53.0	0.85
Goshen**	83	30	58.5	0.29	Piedras Blancas L.H.				0.65
Grass Valley a				2.96	Pigeon Point L. H.				0.81
Green Valley				3.80	Placerville a**	77	32	51.0	3.31
Greenville**†	69	10	37.2	2.92	Placerville b	72	22	45.0	2.94
Gridley**	83	28	51.2	1.65	Pleasanton a**	85	32	50.6	0.73
Guinda				0.81	Pleasanton b†	77	27	46.8	0.71
Hayward**	70	34	50.1	0.72	Pt. Ano Nuevo L. H.				1.55
Healdsburg**	68	32	47.4	1.93	Point Arena L. H.	76			2.42
Hollister**	83	32	53.1	0.79	Point Bonita L. H.	89			1.85
Hornbrook**	74	30	43.9	1.50	Pt. Conception L.H.				0.39
Humboldt L. H.				7.31	Point Fermin L. H.	68			0.28
Huron**	85	35	52.3	0.00	Point George L. H.	80			12.56
Hydesville†	75	26	47.0	6.28	Pt. Huememe L. H.	80			0.36
Indio a**				0.09	Point Loma L. H.				0.95
Indio b	102	36	64.5	0.00	Point Montara L. H.	78			0.85
Indio c	95	34	66.2	0.00	Point Pinos L. H.				0.96
Ione**	84	31	53.0	0.35	Point Reyes L. H.				2.06
Iowa Hill**	72	23	47.0	4.20	Point Sur L. H.	80			0.94
Jackson	60	22	45.0	2.52	Pomona**	80	30	54.7	0.65
Jolon				0.46	Pomona (near)	80	28	53.1	0.65
Julian†	78	31	47.2	4.19	Porterville**	84	34	59.5	0.71
Keeler**	74	30	50.7	0.01	Port Los Angeles**	62	47	53.0	0.23
Keene**	72	30	46.2	2.25	Poway**		33	47.5	1.64
Kennedy Gold Mine	74	25	48.6	2.23	Puente**	79	39	55.4	0.80
Kernville				0.42	Ravenna**	84	28	50.0	0.75
King City**	88	32	49.5	0.30	Red Bluff**	79	38	53.1	1.92
Kingsburg**	80	35	54.0	0.77	Redding a**	80	32	51.7	3.20
Knights Landing**	85	32	53.3	1.24	Redding b†	76	29	50.6	2.89
Lagrange**	79	31	53.3	0.61	Redlands a				1.01
Lathrop**	81	35	53.4	0.63	Redlands b**	84	34	52.1	0.59
Laurel**	80	30	49.5	1.73	Reprea**	78	32	52.2	0.65
Lemoore a**	81	34	53.8	0.00	Rio Vista	78	32	54.2	0.65
Lemoore b	82	27	53.6	0.25	Riverside†	88	27	54.2	0.72
Lick Observatory†	64	20	40.4	2.54	Rocklin**	79	30	55.9	1.08
Lime Point L. H.				0.83	Roe Island L. H.				0.33
Little Bear Valley				3.16	Sacramento a	83	30	54.0	0.74
Little Bear Valley (near)				2.87	Sacramento b**	82	38	54.7	0.63
Livermore**	76	32	49.9	0.81	Sacramento c**	79	37	53.5	0.63
Livingston**	82	38	61.2	0.25	Salton**	103	38	68.6	0.00
Lodi	84	31	53.1	0.57	San Ardo a**	88	28	51.4	0.13
Long Beach**	76	40	53.2		San Bernardino†	85	28	54.0	1.15
Los Angeles**	82	40	58.4	0.43	San Gabriel**	79	36	50.0	0.43
Los Banos**	78	36	53.3	0.00	Sanger Junction**	85	35	55.8	0.56
Los Gatos a**	82	35	55.8	0.85	San Jose a**	74	35	49.8	0.69
Los Gatos b	75	31	48.5	1.30	San Jose b	76	26	48.2	0.77
Lower Holcomb Valley				1.68	San Luis L. H.				0.68
Mammoth Tank**	96	40	63.6	0.00	San Luis Obispo				0.79
Manzana**	83	25	48.8	0.36	San Mateo**	70	39	51.7	1.07
Mare Island L. H.				0.48	San Miguel**	86	32	53.8	0.13
Mariposa**	75	25	48.2	2.11	San Miguel Isl'd†	82	37	52.2	0.40
Martinez**	72	32	50.8	0.52	San Pedro**	79	42	58.3	0.20
Marysville a**	72	35	53.9	0.73	San Rafael†	72	30	47.2	0.85
Mendota**	74	34	46.6	0.00	Santa Ana**	78	45	59.5	0.63
Menlo Park**	80	33	49.9	0.57	Santa Barbara a	74	34	53.4	0.29
Merced**	70	32	52.1	0.21	Santa Barbara b**	80	41	54.3	0.22
Middletown†	80	30	50.3	2.09	Santa Barbara L. H.				0.28
Mills College				1.04	Santa Clara a**	72	32	50.6	0.45
Milton**	72	30	51.4	0.60	Santa Clara b	78	31	52.0	0.60
Millton (near)†	77	33	52.5	1.16	Santa Cruz a†	74	34	52.4	1.41
Modesto**	86	38	53.4	0.00	Santa Cruz b†	78	31	52.3	1.64
Mohave**	81	30	53.7	0.24	Santa Cruz L. H.				1.38
Mokelumne Hill**	81	28	47.0	1.73	Santa Margarita**	84	34	49.6	0.50
Monson**	81	37	55.3	1.23	Santa Maria	80	29	51.7	0.62
Montague**	73	30	47.1	2.28	Santa Monica**	72	31	52.2	0.20
Monterey**	68	32	51.7	0.82	Santa Paula**	78	32	52.3	0.00
Monterey Hotel del Monte**	70	35	58.1		Santa Rosa**	66	33	52.1	1.31
Morses House				5.00	Satcoy†				0.25
Mountain View				0.52	Selma**	80	36	55.5	0.40
Mount Glenwood**	78	35	55.0	1.06	Shasta Springs†	69	19	39.6	4.49
Napa a**	80	32	51.7	0.13	Shingle Springs†	72	22	47.7	1.60
Napa b	76	33	52.9	1.15	Sims**	75	21	42.7	6.37
National City†	82	35	53.3	1.69	Sisson**	70	12	38.7	3.45
Needles†	88	36	62.7	0.65	Sneddens Ranch				0.45
Nevada City†	69	19	43.8	3.26	Soledad**	78	30	51.1	0.40
					Sonoma**	73	33	47.8	1.47
					S. E. Farrallon L. H.				0.75
					South Vallejo**	69	41	52.6	0.47
					Padra**	85	33	55.6	0.44

Meteorological record of voluntary observers, &c.—Continued.

Stations.					Temperature. (Fahrenheit.)				Precip'n.				Stations.					Temperature. (Fahrenheit.)				Precip'n.													
					Max.	Min.	Mean	Precip'n.						Max.	Min.	Mean	Precip'n.						Max.	Min.	Mean	Precip'n.									
California—Cont'd.									Colorado—Cont'd.									Georgia—Cont'd.									Illinois—Cont'd.								
Squirrel Inn	75	32	52.2	0.45	River Bend	80	10	44.1	1.00	Fleming†	92	27	61.9	2.52	Tuscola *†	77	11	43.0	3.03																
Stockton a	74	37	55.5	0.61	Rocky Ford †	80	9	43.3	0.45	Forsyth *†	90	26	62.8	3.71	Walnut †	81	9	44.3	2.98																
Stockton b	74	37	55.5	0.61	Sanborn	66	4	36.0	0.76	Fort Gaines †	87	26	62.6	3.14	Warsaw †	76	9	40.4	3.55																
Suisun City *	80	35	53.9	0.88	San Luis †	66	4	36.0	0.76	Gillsville *†	83	24	54.0	3.54	Winnebago †	76	9	40.4	3.55																
Summit *	43	1	28.9	Scissors†	66	4	36.0	0.76	Hawkinsville †	85	21	59.6	2.40	Indiana.																				
Susanville *†	68	19	39.1	2.35	Seibert†	67	3	34.8	1.90	Hephzibah *†	82	26	63.2	2.28	Angola *	76	10	41.4	2.73																
Tehachapi a	62	26	42.4	0.00	Smoky Hill Mine †	67	3	34.8	1.90	Lafayette †	81	19	54.8	4.03	Ashboro †	79	12	48.6	2.90																
Tehachapi b	72	30	41.6	1.45	Stanford †	67	3	34.8	1.90	Lagrange †	82	20	57.4	4.50	Bedford †	86	13	48.0	2.40																
Tehama *	72	34	55.1	1.00	Steamboat Spring †	49	-10	26.0	1.60	Leverett †	88	21	56.8	1.71	Bellville †	82	14	48.0	3.18																
Templeton *	83	28	57.7	0.61	Sunnyside	52	5	27.4	1.29	Louisville †	89	24	58.7	3.64	Cambridge City †	79	11	45.4	2.78																
Towles *	70	14	42.8	5.39	Surface Creek †	65	12	40.7	1.80	Lumpkin †	84	23	60.8	2.18	Columbia City *†	73	12	43.2	2.48																
Tracy *	82	40	53.6	0.00	Thon †	77	1	38.3	0.07	McArthur †	90	27	62.1	3.35	Columbus	81	14	47.3	2.48																
Traveler *	76	44	39.3	0.37	T. S. Ranch †	70	13	42.4	1.13	Macon †	85	18	55.6	3.39	Connersville †	80	14	46.2	3.39																
Trinidad L. H.	80	38	55.3	0.90	Vilas	60	10	39.5	0.10	Marietta †	82	15	55.6	3.41	Degonia Springs *	76	17	50.4	3.21																
Tropic *	50	-7	31.0	2.65	Waller†	59	10	36.0	1.10	Marshallville †	85	22	62.0	3.75	Delphi	76	10	43.1	2.79																
Truckee *	82	33	53.7	0.98	Ward District	59	10	36.0	1.10	Millen †	80	24	59.7	2.50	Evansville †	79	15	46.2	2.17																
Tulare a	92	28	55.2	0.77	Watkins *	59	10	36.0	1.10	Monticello *†	81	23	60.4	3.07	Farmland †	79	15	46.2	2.17																
Tulare b.	92	28	55.2	0.77	Yuma	59	10	36.0	1.10	Morgan †	85	27	61.8	2.09	Franklin *	76	15	46.4	2.47																
Tunnel No. 2	80	35	57.6	0.00	Connecticut.				Quitman †	88	22	56.6	2.85	Hammond †	76	10	45.9	1.78																	
Turlock a	80	25	51.9	0.20	Bridgeport *†	61	21	39.8	1.48	Piscataway †	84	23	56.6	2.85	Hawpatch †	73	8	41.1	2.47																
Turlock b †	80	25	51.9	0.20	Canton	72	12	39.9	1.55	Poulton †	86	26	61.2	3.92	Huntingburg *†	76	22	50.1	3.08																
Ukiah †	71	26	48.2	3.03	Colchester	63	16	41.2	1.55	Quitman †	88	22	56.6	2.85	Huntington	77	14	46.5	2.46																
Upper Lake	79	27	48.8	1.80	Falls Village	63	16	41.2	1.55	Resaca †	82	21	55.2	3.72	Jasper †	77	10	48.9	2.95																
Upper Mattatoe *	78	36	51.0	8.45	Greenfield Hill	66	19	41.4	1.62	Talbot	82	21	59.0	3.13	Jeffersonville	80	18	50.0	2.98																
Vacaville a *	82	35	53.0	1.16	Hartford b.	66	19	41.4	1.62	Thomasville †	85	29	63.2	7.12	Kokomo *	81	12	45.8	2.90																
Vacaville b *	82	37	55.1	0.80	Hartford c.	66	19	41.4	1.62	Toccoa †	82	26	57.7	3.37	Laconia	77	14	48.4	3.45																
Valley Springs *	68	33	50.2	0.91	Lake Konomoc	66	19	41.4	1.62	Washington †	85	22	59.0	3.87	Lafayette †	78	11	45.3	2.81																
Ventura †	68	33	51.4	0.27	Lebanon	67	17	41.7	1.78	West Point †	82	21	56.8	3.93	Logansport a	76	14	45.7	2.65																
Vina *	76	41	54.6	1.41	Middletown	67	17	41.7	1.78	Whitesburg †	82	21	56.8	3.93	Logansport b	76	14	45.7	2.65																
Volcano Springs *	105	38	71.5	0.00	New Hartford a *†	65	13	38.4	1.83	Idaho.	60	14	35.4	1.76	Madison †	83	17	49.2	2.98																
Walnut Creek	79	30	51.8	0.67	New Hartford b.	65	13	38.4	1.83	American Falls†	40	9	24.0	7.20	Marengo *	78	18	45.4	7.50																
Weaverville †	78	21	46.8	4.60	N. Grosvenor Dale	64	19	40.3	0.94	Atlanta †	72	21	41.0	1.64	Marion †	81	12	47.0	3.36																
Wenrich Ranch	80	31	55.5	0.58	Normark	65	16	39.5	1.22	Boise Barracks	66	-2	33.8	0.69	Markle †	74	11	43.8	2.59																
West Butte *	79	38	57.6	0.11	Southington *†	67	18	40.2	1.21	Fort Lemhi †	60	12	35.0	7.00	Mauzy	79	16	44.8	3.21																
West Point †	78	32	52.6	1.09	South Manchester	64	14	39.2	1.18	Garden Valley *†	54	8	31.8	7.35	Mount Vernon †	78	16	49.8	2.94																
Wheatland	82	40	59.4	0.63	Stevenson	64	14	39.2	1.18	Granville	55	15	34.4	3.37	Muncie †	75	16	46.0	6.45																
Whittier *	80	30	54.4	0.86	Storrs	64	14	39.2	1.18	Hailey	55	15	34.4	3.37	New Albany *†	80	16	51.1	3.37																
Williams *	86	30	48.3	0.81	Thompson *†	60	15	38.2	1.65	Idaho City †	61	6	30.4	3.94	Princeton *†	80	15	48.8	3.15																
Willows a †	75	35	50.6	1.03	Voluntown †	62	11	41.2	1.65	Kootenai †	55	18	34.2	0.40	Rockville †	78	10	46.9	3.73																
Willows b †	75	35	50.6	1.03	Wallingford †	68	18	41.0	1.69	Lake †	52	-12	26.8	2.90	Rushville †	78	10	46.9	3.73																
Winchester †	89	22	53.3	0.77	Waterbury	68	18	41.0	1.69	Kootenai †	55	18	34.2	0.40	Seymour †	80	16	47.8	2.75																
Winters *	76	35	54.8	0.73	West Simsbury	68	18	41.0	1.69	Lake †	52	-12	26.8	2.90	Shelbyville †	80	14	47.7	2.86																
Wire Bridge *	78	31	51.0	2.19	Dover †	79	21	47.8	1.27	Lewiston †	68	21	43.0	1.22	South Bend †	75	11	43.9	2.49																
Woodland	74	36	50.7	0.80	Millford	84	19	48.8	1.43	Martin†	53	3	29.8	3.93	Terre Haute †	79	15	48.8	2.10																
Yerba Buena L. H.	72	12	42.5	3.32	Millboro	82	17	45.5	1.60	Moscow †	58	12	37.3	3.43	Union City †	85	11	46.4	0.98																
Yreka †	72	12	42.5	3.32	Seaford †	82	18	48.4	1.18	Murray †	69	11	34.8	4.95	Valparaiso †	74	10	40.3	2.60																
Yuba City *	72	43	56.9	0.89	District of Columbia.				Salubria †	62	-5	35.6	3.45	Vealderburg †	77	11	44.4	3.25																	
Colorado.									Salubria †	62	-5	35.6	3.45	Vevay	85	16	49.2	2.14																	
Abbott	72	10	38.4	0.57	Salubria †	62	-5	35.6	3.45	Payette †	71	16	41.4	1.45	Worthington †	86	14	48.8	2.77																
Akron †	45	-6	23.1	0.88	Salubria †	62	-5	35.6	3.45	Soldier†	57	-10	25.6	3.07	Indian Territory.																				
Alma †	45	-6	23.1	0.88	Salubria †	62	-5	35.6	3.45	Albion †	80	14	49.4	2.43	Eufaula †	79	10	48.8	2.77																
Amherst †	45	-6	23.1	0.88	Salubria †	62	-5	35.6	3.45	Atwood *	78	10	42.0	4.22	Gwendale †	79	10	48.8	2.77																
Arboles	45	-6	23.1	0.88	Salubria †	62	-5	35.6	3.45	Aurora †	78	10	42.0	4.22	Kemp†	89	23	57.5	7.28																
Avoca	76	15	42.2	1.40	Salubria †	62	-5	35.6	3.45	Beardstown †	77	9	41.6	3.17	Lehigh †	88	19	54.4	6.54																
Boulder †	76	15	42.2	1.40	Salubria †	62	-5	35.6	3.45	Bloomington †	82	7	44.8	3.37	Purcell †	83	12	57.7	4.71																
Box Elder	61	-14	23.3	0.39	Salubria †	62	-5	35.6	3.45	Braidwood †	78	12	45.6	2.87	South McAlester †	84	23	56.2	4.77																
Breckenridge †	79	3	39.2	0.90	Salubria †	62	-5	35.6	3.45	Bushnell †	81	8	45.4	2.28	Tulsa †	84	23	56.2	4.77																
Brush †	79	3	39.2	0.90	Salubria †	62	-5	35.6	3.45	Carlville †	83	13	48.2	3.15	Iowa.																				
Byers *	66	10	33.9	0.90	Salubria †	62	-5	35.6	3.45	Carlyle	79	12	48.4	2.68	Algona *	79	0	37.9	1.57																
Canyon †	73	11	43.8	1.16	Salubria †	62	-5	35.6	3.45	Carrollton	79	12	48.4	2.68	Alta †	82	-4	37.3	0.75																
Castle Rock †	74	3	38.8	0.95	Salubria †	62	-5	35.6	3.45	Chemung	75	6	39.6	1.59	Amana †	78	4	41.1	2.92																
Cheyenne Wells *†	80	10	35.0	0.10	Salubria †	62	-5	35.6	3.45	Chester †	77	10	47.6	2.79	Ames b	81	-1	39.6	1.51																
Climax *†	38	-12	15.3	4.81	Salubria †	62	-5	35.6	3.45	Dixon †	82	4	42.0	3.12	Ames c	81	-1	39.6	1.51																
Collbran	51	-2	26.0	0.66	Salubria †	62	-5	35.6	3.45	East Peoria †	85	11	46.6	2.91	Atlantic †	84	4	42.1	1.43																
Como (near) †	78	7	40.2	0.50	Salubria †	62	-5	35.6	3.45	Effingham †	80	14	48.5	3.40	Audubon	81	1	41.1	1.09																
Cope †	78	7	40.2	0.50	Salubria †	62	-5	35.6	3.45	Evanston *†	74	9	41.3	3.17	Belle Plaine	78	3	40.7	3.05																
Deer Trail *	76	7	41.8	0.64	Salubria †	62	-5	35.6	3.45	Fort Sheridan †	76	9	40.8	2.01	Bonaparte †	80	7	44.6	2.51																
Delta †	66	-3	32.6	0.83	Salubria †	62	-5	35.6	3.45	Galva †	79	6	44.2	2.53	Carroll †	82	0	38.5	1.76																
Divide Ex. Station.	74	9	41.5	0.93	Salubria †	62	-5	35.6	3.45	Golconda †	81	18	53.4	3.54	Cedar Falls †	80	2	39.4	0.98																
Downing†	60	6	35.4	0.10	Salubria †	62	-5	35.6	3.45	Greenville †	83	13	49.4	3.53	Cedar Rapids †	75	6	42.5	4.52																
East Dale	77	10	41.8	0.08	Salubria †	62	-5	35.6	3.45	Halliday *	80	11	46.8	2.15	Centerville †	75	3	45.7	2.15																
First View *	73	10	37.4	0.67	Salubria †	62	-5	35.6	3.45	Havana †	82	11	48.2	2.12	Charles City †	78	-1	36.7	1.46																
Fort Collins †	70	11	44.2	2.21	Salubria †	62	-5	35.6	3.45	Herrins Prairie *	80	20	53.6	3.40	Clairinda †	81	5	41.8	1.17																
Glenwood Spgs †	57	7	36.7	1.27	Salubria †	62	-5	35.6	3.45	Jordans Grove †	81	16	50.7	2.81	Clinton	80	3	42.6	2.80																
Gold Hill *	57	7	36.7	1.27	Salubria †	62	-5	35.6	3																										

MONTHLY WEATHER REVIEW.

MARCH, 1894.

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
Idaho—Cont'd.					Kentucky—Cont'd.				
Mount Vernon*1...	79	3	40.4	3.65	Bowling Green*1...	86	16	54.3	2.72
Murray	79	3	41.9	2.21	Burnside	78	10	47.6	1.13
North McGregor	79	3	41.9	2.21	Caddo*1	78	10	47.6	2.90
Osgood*1	80	1	34.3	1.85	Canton*1	78	10	47.6	5.35
Oskaloosa	81	6	43.1	2.21	Carrollton*1	85	19	49.8	2.34
Ottumwa	81	6	44.8	2.36	Cattletaburg*1	79	19	50.3	1.25
Ovid	80	5	43.2	2.36	Eddyville	80	14	51.2	2.70
Panama	82	5	42.1	0.62	Edmonton	81	14	49.3	4.71
Richland	84	4	47.3	3.61	Elizabethtown	85	10	49.9	1.84
Rockwell City	82	—	37.5	1.35	Falmouth	82	16	52.9	2.50
Sac City	80	—	37.5	1.15	Ford Ferry	80	30	54.9	3.39
Seymour	80	—	37.5	0.72	Franklin	81	13	48.7	3.60
Sibley	80	—	37.5	0.72	Georgetown	86	14	49.3	2.04
Spirit Lake	82	—	37.5	1.01	Greendale	77	16	51.0	3.26
Tipton	79	—	37.5	1.17	Greensburg	84	12	50.0	2.10
Toledo	82	—	37.5	2.53	Harrodsburg	81	18	53.4	1.70
Vinton	71	4	40.3	2.41	Henderson	85	14	51.7	1.26
Washington	82	4	40.3	2.97	Hendricks	83	14	51.7	2.19
Webster City	80	—	37.5	1.70	Middleboro	85	14	51.7	1.80
West Bend	80	—	37.5	1.70	Mount Sterling	82	15	47.6	1.35
Williams	70	—	37.5	1.62	Munfordville	82	15	47.6	3.86
Winters	81	3	42.0	2.76	Paducah	82	18	54.0	3.83
Illinois.					Pellville	79	10	50.8	3.80
Achilles	86	8	48.8	0.62	Princeton	82	11	50.4	4.16
Achilles*	84	9	35.0	0.37	Richmond	84	10	50.8	1.15
Allison*	84	9	39.6	0.25	Russellville	83	10	50.8	3.73
Altoona*	79	16	46.9	2.21	Sandy Hook	80	11	48.0	1.15
Atchison	83	8	46.4	1.79	Shelby City	80	16	50.2	1.96
Beloit	85	4	41.8	0.05	South Fork	84	16	49.6	2.94
Bucklin	86	11	47.8	0.05	Springfield	85	15	50.8	2.39
Burlington	86	11	47.8	0.05	Williamsburg	85	15	50.8	2.55
Cawker City	74	8	41.8	0.20	Louisiana.				
Colby	81	7	42.2	0.30	Abbeville	87	31	64.1	7.06
Coldwater	88	10	47.7	0.33	Alexandria	85	30	61.7	6.61
Colyer	81	14	49.2	0.25	Amite	85	30	61.7	7.69
Columbus	79	14	49.2	3.37	Baton Rouge	88	24	50.6	9.67
Coolidge	81	9	44.8	0.10	Calhoun	83	29	61.6	7.68
Cunningham	83	7	47.8	0.42	Cameron	84	25	59.2	8.21
Downs	80	11	46.0	0.13	Cheneyville	83	32	62.8	2.91
Eldorado	80	11	46.0	0.50	Clinton	83	32	62.8	5.36
Elk City	80	17	50.8	1.92	Coushatta	83	35	65.6	5.86
Emporia	80	12	48.7	1.35	Coushatta*	84	25	61.0	10.46
Englewood	92	5	47.9	0.07	Davis	83	22	58.8	6.33
Eureka Ranch	84	5	47.9	0.61	Dehi	86	32	61.6	8.03
Fort Riley	80	8	43.7	0.63	Donaldsonville	81	32	62.2	5.91
Garden City	82	8	45.8	1.20	Emilie	82	26	58.4	8.54
Garfield	78	1	41.3	0.60	Farmerville	84	33	64.4	5.07
Gibson	85	14	41.2	0.37	Girard	85	27	58.4	8.58
Gove*	85	14	41.2	0.37	Grand Coteau	82	35	64.4	8.68
Grainfield	82	12	48.8	1.65	Hammond	86	29	62.0	7.60
Grinnell	82	12	48.8	1.65	Jeanerette	83	32	63.8	4.65
Halstead	76	10	46.4	0.05	Lafayette	83	32	63.3	7.49
Hays City	85	1	46.4	0.00	Lake Charles	83	28	58.6	3.25
Horton	82	9	44.0	0.69	Lake Providence	83	28	58.6	3.25
Hutchinson	84	12	48.4	0.69	Liberty Hill	88	35	59.7	7.38
Independence	80	14	50.6	2.73	Maurepas	88	22	60.2	7.87
Ionia	87	6	42.5	0.25	Melville	86	29	63.6	8.02
Jacquet	82	10	44.2	0.65	Minden	86	24	59.2	8.35
Johnson	82	10	44.2	0.65	Monroe	85	26	61.4	10.48
Kiowa	85	9	50.4	0.65	Natchitoches	85	25	59.6	9.63
Lakin	86	10	48.3	1.03	New Iberia	81	45	67.6	2.98
Lawrence	80	9	48.1	1.66	Oxford	85	34	57.2	8.11
Lebo	83	8	43.1	0.38	Paincourtville	85	31	64.0	5.11
Leoti	84	5	46.8	0.20	Plain Dealing	84	25	58.0	7.86
Macksville	80	10	46.4	0.73	Plaquemine	84	30	62.8	7.07
McPherson	86	8	47.3	0.67	Roseland	84	28	61.8	6.03
Manhattan	82	8	43.0	0.81	St. Joseph	85	30	60.8	4.44
Manhattan*	82	8	43.0	0.81	Schriever	84	32	65.2	6.37
Marion	82	9	47.1	0.67	Shell Beach	80	34	62.8	4.47
Marmaton	82	9	47.1	0.67	Sugar Ex. Station	83	32	62.1	7.66
Medicine Lodge	82	9	47.1	0.67	Thibodeaux	81	22	59.0	7.55
Minneapolis	86	4	45.2	0.23	Wallace	84	34	63.6	5.67
Monument	84	12	42.4	0.10	Winnfield	84	27	60.5	5.02
Morland	84	3	43.2	0.45	Winsboro	86	30	59.4	7.20
Morton	84	10	46.6	0.40	Maine.				
Mount Hope	82	16	49.0	0.66	Bar Harbor	57	14	35.8	1.46
Norton	83	8	44.3	0.45	Belfast	54	19	34.8	1.58
Olathe	80	8	47.4	2.28	Calais	66	12	34.6	2.18
Oswego	81	9	49.4	3.43	Cornish	65	12	35.9	1.93
Pauline	80	12	48.4	0.87	Fairfield	58	9	33.7	0.86
Phillipsburg	72	3	45.9	0.06	Farlington	72	2	35.2	2.20
Pleasant Dale	83	3	45.9	0.06	Fort Kent	65	—	31.4	1.60
Quinter	82	8	48.7	1.18	Gardiner	57	—	28.8	1.44
Rome	80	13	50.5	2.81	Houlton	57	—	29.4	1.31
Sedan	80	13	50.5	2.81	Indian Stream	62	13	34.3	1.99
Sharon Springs	84	10	43.5	0.30	Lewiston	68	13	34.3	1.70
Sterling	80	10	43.5	0.30	Madison	62	13	34.3	1.70
Topeka	79	10	43.5	0.30	Mattawamkeag	61	—	30.2	1.21
Tribune	80	9	44.8	1.17	North Bridgeton	58	—	33.6	2.51
Ulysses	85	8	46.0	0.10	Orono	63	8	32.5	1.23
Wakefield	83	12	47.0	0.36	Petit Menan	42	19	33.3	1.35
Wallace	80	10	45.6	0.92	West Jonesport	48	13	35.2	1.35
Wamego	80	10	45.6	0.92	Massachusetts.				
Washington	85	7	46.1	0.68	Adams	70	14	39.6	1.45
Winfield	82	10	48.6	1.07	Amherst	73	16	39.9	1.45
Winona	84	14	44.8	2.15	Amherst Ex. St'n.	73	16	39.9	1.66
Yates Center	80	—	37.5	1.62	Andover	73	17	39.6	1.77
Kentucky.					Ashland	74	18	39.7	0.99
Alpha*	83	18	56.7	2.30	Bedford	74	17	40.8	1.07
Blainville	76	14	50.6	4.38	Beverly Farms	74	17	40.8	1.07
Bowling Green	78	21	49.3	2.89	Blue Hill (sum'')	66	15	39.6	1.12

Meteorological record of voluntary observers, &c.—Continued.

Stations.				Temperature. (Fahrenheit.)				Precip'n.	Stations.				Temperature. (Fahrenheit.)				Precip'n.
				Max.	Min.	Mean					Max.	Min.	Mean				
Maryland.									Michigan.								
Bachmans Val. #1.	74	16	42.4	2.78	Adrian	76	7	41.3	Ins.								
Benedict	86	30	49.5	0.97	Albion	72	8	39.8	2.33								
Bootherville #1	78	14	45.3	1.00	Allegan	76	8	41.5	1.51								
Charlotte Hall	83	15	48.7	0.91	Alma	78	7	38.0	1.73								
College Park	82	16	46.9	1.27	Ann Arbor	73	10	38.4	2.10								
Cumberland #1	76	18	44.9	1.33	Arbela	73	10	38.4	1.11								
Darlington #1	78	18	46.7	1.29	Ball Mountain	73	7	38.2	1.11								
Denton #1	82	23	51.2	0.84	Bear Lake	67	5	35.1	4.16								
Easton	80	18	45.4	1.70	Bellaire	76	4	36.0	2.30								
Fallston	76	16	45.6	1.60	Benton Harbor	77	12	42.6	2.79								
Fenby #1	79	19	47.4	1.45	Berlin #1	76	6	37.7	1.24								
Great Falls #1	75	18	48.2	1.45	Berrien Springs #1	76	16	44.4	3.37								
McDonogh #1	80	16	47.6	1.45	Birmingham	72	12	39.4	1.70								
Mardela Springs #1	78	11	43.9	0.65	Boon	73	—	34.4	5.71								
Mt. St. Marys Col. #1	70	4	40.8	2.24	Bronson	77	6	40.2	2.10								
New Market #1	82	22	48.8	1.17	Brown City	75	8	39.0	0.71								
Oakland #1	82	22	48.8	1.17	Calumet	55	—	27.2	3.36								
Pocomoke City	81	18	51.2	0.93	Charlevoix	76	10	36.6	1.35								
Solomons #1	82	22	48.8	1.17	Cheboygan	74	—	32.4	3.05								
Sunnyside	74	2	39.4	2.51	Clinton	75	6	40.8	3.33								
Taneytown	82	16	48.2	0.93	Crystal Falls	59	—	29.8	1.40								
Upper Marlboro #1	82	16	48.2	0.93	Ewart #1	73	3	36.2	3.26								
Valley Lee #1	78	16	45.8	2.84	Fairview	75	8	39.2	1.52								
Woodstock	78	16	45.8	2.84	Fitchburg	73	5	39.5	2.09								
Massachusetts.									Minnesota.								
Adams	70	14	39.6	1.45	Flint	75	8	39.2	1.52								
Amherst	73	16	39.9	1.45	Frankfort #1	77	7	38.4	1.04								
Amherst Ex. St'n. #1	73	16	39.9	1.66	Grande Pointe au	62	18	39.0	...								
Andover	73	17	39.6	1.77	Sable #10	60	12	34.3	...								
Ashland	74	18	39.7	0.99	Grand Rapids	75	10	41.0	2.60								
Bedford	74	17	40.8	1.07	Grape	76	7	41.8	1.34								
Beverly Farms	74	17	40.8	1.07	Grayling	65	0	31.9	1.10								
Blue Hill (sum'')	66	15	39.6	1.12	Hammonds Bay #10	70	10	33.5	...								
Blue Hill (valley)	69	17	40.4	1.02	Hanover	72	6	41.1	2.06								
Boston	69	17	40.4	1.02	Harbor Springs	74	0	34.4	3.07								
Brookton	69	17	40.4	1.02	Harrison	75	2	36.4	2.73								
Brookton b.	69	17	40.4	1.02	Hart	74	5	34.2	3.01								
Brookton c.	69	17	40.4	1.02	Hastings	65	6	42.2	4.10								
Cambridge a	72	19	42.0	0.37	Hayes	72	9	39.6	1.44								
Cambridge b.	71	20	41.4	0.84	Highland Station	76	10	40.0	1.70								
Cambridge Hill	70	17	41.8	1.14	Holland #10	75	10	39.4	1.57								
Clinton	70	17	41.8	1.14	Howell	72	13	40.7	...								
Concord #1	73	16	40.5	0.93	Jeddo	73	9	39.7	1.95								
Dorchester	68	14	39.6	1.29	Kalamazoo	73	11	38.0	0.60								
Dorchester	68	16	37.3	0.63	Lansing	74	11	41.3	1.30								
Dorchester	68	16	37.3	0.63	Lathrop #1	74	10	39.2	1.26								
Dorchester	68	16	37.3	0.63	Lewiston	56	1	30.0	1.80								
Dorchester	68	16	37.3	0.63	Lodi	76	2	35.4	1.94								
Dorchester	68	16	37.3	0.63	Ludington #1	73	0	35.3	3.10								
Dorchester	68	16	37.3	0.63	Madison	55	18	38.0	...								
Dorchester	68	16	37.3	0.63	Manistee #10	74	7	40.4	1.81								
Dorchester	68	16	37.3	0.63	Mayville	58	14	34.3	...								
Dorchester	68	16	37.3	0.63	Mottville	77	8	38.4	1.62								
Dorchester	68	16	37.3	0.63	N. Manitou Isl'd #10	77	7	41.8	1.66								
Dorchester	68	16	37.3	0.63	North Marshall	73	12	35.1	...								
Dorchester	68	16	37.3	0.63	Northport	72	4	37.7	1.09								
Dorchester	68	16	37.3	0.63	Old Mission	77	12	36.6	2.59								
Dorchester	68	16	37.3	0.63	Olivet	75	9	35.4	2.22								
Dorchester	68	16	37.3	0.63	Ottawa Point #1	73	5	44.2	0.40								
Dorchester	68	16	37.3	0.63	Ovid	50	10	35.0	...								
Dorchester	68	16	37.3	0.63	Paris	74	9	39.0	1.27								
Dorchester	68	16	37.3	0.63	Point Betsey #1	72	0	36.2	4.42								
Dorchester	68	16	37.3	0.63	Rawsonville #1	62	12	38.6	...								
Dorchester	68	16	37.3	0.63	Rockland	78	14	41.3	1.73								
Dorchester	68	16	37.3	0.63	Saint Ignace	59	0	31.2	2.60								
Dorchester	68	16	37.3	0.63	Sand Beach	75	11	31.5	3.41								
Dorchester	68	16	37.3	0.63	Stanton	75	11	39.1	1.95								
Dorchester	68	16	37.3	0.63	Thornville	76	4	37.4	1.47								
Dorchester	68	16	37.3	0.63	Thunder Bay Id #10	52	5	40.8	0.57								
Dorchester	68	16	37.3	0.63	Vandalia	72	12	34.8	...								
Dorchester	68	16	37.3	0.63	Williamston #1	75	14	41.6	2.78								
Dorchester	68	16	37.3	0.63	Ypsilanti	74	14	43.4	1.12								
Dorchester	68	16	37.3	0.63	Minnesota.	59	9	39.8	1.91								
Dorchester	68	16	37.3	0.63	Ada #1	58	—	32.0	1.13								
Dorchester	68	16	37.3	0.63	Airliet #1	78	—	36.0	0.92								
Dorchester	68	16	37.3	0.63	Albert Lea #1	76	—	34.3	2.09								
Dorchester	68	16	37.3	0.63	Alexandria #1	64	—	26.0	...								
Dorchester	68	16	37.3	0.63	Alexandria #1	53	—	27.8	...								
Dorchester	68	16	37.3	0.63	Barrett #1	70	—	32.4	2.29								
Dorchester	68	16	37.3	0.63	Beardsley #1	70	—	33.4	3.30								
Dorchester	68	16	37.3	0.63	Belle Plaine #1	70	—	37.2	0.70								
Dorchester	68	16	37.3	0.63	Bingham Lake #1	80	—	37.2	1.43								
Dorchester	68	16	37.3	0.63	Bird Island	77	—	34.0	1.47								
Dorchester	68	16	37.3	0.63	Blooming Prairie #1	74	—	35.0	1.67								
Dorchester	68	16	37.3	0.63	Bonniwells Mills #1	72	—	36.4	2.70								
Dorchester	68	16	37.3	0.63	Caledonia #1	76	—	31.5	2.67								
Dorchester	68	16	37.3	0.63	Cambridge #1	80	—	34.0	1.61								
Dorchester	68	16	37.3	0.63	Camden #1	66	—	30.1	1.89								
Dorchester	68	16	37.3	0.63	Campbell	73	—	27.5	2.88								
Dorchester	68	16	37.3	0.63	Carver #1	72	—	31.5	1.95								
Dorchester	68	16	37.3	0.63	Clear Lake #1	73	—	30.9	1.47								
Dorchester	68	16	37.3	0.63	Clearwater #1	72	—	34.6	1.38								
Dorchester	68	16	37.3	0.63	Collegeville	76	—	25.2	4.67								
Dorchester	68	16	37.3	0.63	Cromwell #1	50	—	24.0	2.10								
Dorchester	68	16	37.3	0.63	Crookston #1	48	—	32.8	...								
Dorchester	68	16	37.3	0.63	Dassel #1	72	—	32.8	...								
Dorchester	68	16	37.3	0.63	Dawson #1	76	—	34.3	2.80								
Dorchester	68	16	37.3	0.63	Excel #1	48	—	29.1	1.70								
Dorchester	68	16	37.3	0.63	Farmington #1	76	—	33.7	1.62								
Dorchester	68	16	37.3	0.63	Fergus Falls #1	59	—	33.6	1.61								
Dorchester	68	16	37.3	0.63	Fort Ripley #1	81	—	33.7	1.62								
Dorchester	68	16	37.3	0.63	Grand Meadow #1	75	—	33.6	1.61								
Dorchester	68	16	37.3	0.63	Granite Falls	86	—	33.6	1.61								
Dorchester	68	16	37.3	0.63	Hutchinson #1	61	—	33.6	1.61								

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
Minnesota—Cont'd.	°	°	°	Ins.	Missouri—Cont'd.	°	°	°	Ins.
Jadis t.	46	—14	25.2	1.95	Farmersville	85	11	49.8	2.92
Lake Vermilion t.	59	—13	28.6	2.29	Fayette	85	11	49.8	2.20
L. Winnibigoshish st	59	—14	27.0	3.07	Fox Creek st	82	12	50.8	2.73
Leech Lake st	57	—19	27.1	3.07	Fulton st	80	7	46.6	2.80
Long Prairie st	66	—9	28.4	1.82	Gayoso st	80	20	50.8	7.97
Luverne st	77	—5	35.5	0.81	Gallatin st	83	11	48.9	1.97
Maple Plain st	75	—4	34.0	2.96	Glasgow	83	11	48.9	1.97
Marfield st	55	—15	26.2	3.83	Gordonville st	82	19	49.2	4.20
Mazeppa st	75	—2	32.2	0.74	Gorin st	72	13	43.0	2.28
Medford st	78	—2	35.8	2.00	Grove Dale	82	7	50.8	3.74
Milan st	79	—6	32.4	1.80	Half Way	89	10	49.3	2.10
Minneapolis a st	75	—3	34.5	3.05	Harrisonville st	81	12	47.8	2.71
Minneapolis b st	74	—3	33.6	2.93	Haastain st	81	12	47.8	2.71
Minnesota City st	77	—6	37.1	1.23	Hermann st	81	12	47.8	2.71
Montevideo st	80	—5	34.0	1.28	Houston	75	10	48.0	5.57
Morris st	71	—6	30.4	1.69	Iron River st	80	13	49.6	4.73
New London	72	—6	30.9	1.37	Kidder	81	8	45.3	2.86
New Richland st	74	—4	32.4	1.37	Lamar st	80	15	49.5	3.88
New Ulm	76	—0	36.8	2.03	Lamonte st	76	16	45.4	2.43
Ortonville st	54	—15	26.9	1.73	La Plata st	80	14	50.9	5.63
Park Rapids st	56	—12	27.0	1.73	Lebanon	83	12	49.6	2.43
Perham st	55	—12	27.9	2.33	Lexington st	86	13	49.2	2.69
Pine River st	55	—12	27.9	2.33	Liberty	86	13	49.2	2.69
Pokagama Falls st	60	—24	25.7	3.80	Louisiana Bridge st	82	13	47.4	3.76
Red Lake st	51	—14	25.8	1.00	McCune st	83	13	47.4	3.76
Red Wing st	73	—3	35.9	1.75	Marceline	83	11	47.0	2.46
Redwood Falls st	73	—3	35.9	1.75	Marshall st	85	12	46.7	2.85
Rolling Green st	73	—3	35.9	1.75	Mexico st	82	15	51.0	4.16
Rush City st	74	—1	30.7	1.05	Mine La Motte st	82	13	49.0	4.22
Saint Charles st	68	—3	32.8	2.55	Mount Vernon	84	11	50.3	3.31
Saint Cloud	57	—8	29.5	1.74	Neosho	80	12	49.2	3.54
Saint Olof	77	—1	37.0	3.10	New Boston	82	12	49.2	3.54
Sandy Lake Dam st	70	—10	28.5	2.41	New Hartford st	82	16	50.2	3.31
Sauk Center	70	—10	28.5	2.41	New Haven st	79	20	54.4	7.44
Starbuck st	74	—6	30.1	1.72	New Madison	83	13	51.0	3.05
Sunrise City st	51	—6	29.4	1.29	New Palestine	80	16	51.2	3.44
Two Harbors st	76	—0	35.8	2.03	Oak Ridge st	80	14	51.5	5.51
Wabasha st	75	—5	34.2	2.11	Olden st	84	8	46.0	2.00
Willmar st	75	—5	34.2	2.11	Oregon a st	83	9	45.2	1.89
Winona	78	—5	37.8	1.49	Oregon b st	83	9	45.2	1.89
Worthington	78	—5	37.8	1.49	Oto	83	9	45.2	1.89
Mississippi.					Palmyra	82	12	49.2	2.00
Aberdeen st	83	24	57.2	6.79	Panacea	81	14	47.9	1.10
Agricultural College	82	22	57.0	7.79	Paris	79	13	48.3	4.10
Batesville st	82	30	60.8	6.00	Phillipsburg st	84	6	42.9	1.52
Biloxi st	83	30	60.8	5.48	Pickering st	80	12	42.5	2.16
Briars st	82	28	59.4	5.46	Platte River st	80	17	52.8	5.64
Brookhaven st	82	28	59.4	5.46	Potosi	77	5	46.4	3.16
Canton st	83	24	59.4	5.46	Princeton st	80	6	46.0	1.60
Clarksdale st	83	24	59.4	5.46	Round Spring	82	14	49.6	4.91
Columbus st	84	24	60.5	3.77	Saint Charles	82	14	49.6	4.91
Crystal Springs st	84	24	60.5	3.77	Saint Joseph st	82	14	49.6	4.91
Duck Hill st	84	24	60.5	3.77	Sarcoxie st	86	18	49.2	2.70
Edwards st	85	26	60.2	10.11	Sedalia	82	9	48.8	2.33
Enterprise st	85	26	60.2	10.11	Shelbina	82	9	48.8	2.33
French Camp st	79	18	54.3	7.13	Shelbina	82	9	48.8	2.33
Greenville a st	79	24	57.6	8.98	Shelbina	82	9	48.8	2.33
Greenville b st	88	23	59.2	9.48	Shelbina	82	9	48.8	2.33
Hattiesburg st	80	23	56.8	5.07	Stellada st	83	13	49.8	2.44
Hernando st	80	23	56.8	5.07	Stellada st	83	13	49.8	2.44
Itta Bena st	84	28	57.8	8.26	Sublett st	78	8	45.4	3.70
Jackson st	85	27	60.9	3.56	Unionville	81	11	47.5	1.83
Kosciusko st	85	23	57.2	5.55	Vermont st	81	11	47.5	1.83
Lake st	86	23	56.6	3.69	Vilas	82	14	48.6	1.74
Leakesville st	86	23	56.6	3.69	Warrensburg st	80	14	48.6	1.74
Logtown st	82	32	62.6	6.85	Warrenton	80	12	49.3	3.08
Louisville st	84	28	62.3	2.77	Wheatland	80	13	47.8	2.56
Macomb st	86	25	61.7	8.32	Whiteside	80	13	47.8	2.56
Macon st	86	25	61.7	8.32	Montana.				
Mayersville st	82	30	62.7	6.25	Boulder st	57	—1	28.0	0.71
Moss Point st	85	28	62.2	5.94	Choteau st	60	0	30.0	0.80
Natchez st	85	28	62.2	5.94	Deer Lodge City st	64	0	31.7	0.56
Okolona st	83	24	57.5	7.26	Fort Custer st	62	—7	28.4	1.80
Palo Alto st	82	24	57.7	6.35	Fort Keogh	64	—9	25.5	1.75
Pontotoc st	84	34	63.4	7.46	Fort Logan st	50	4	27.3	1.26
Stonington st	84	30	60.0	7.46	Fort Missoula	57	12	32.0	1.33
Thornton st	84	28	58.0	4.00	Glasgow st	69	—7	27.6	2.60
Topon st	81	23	56.7	8.06	Glendive st	62	—8	28.9	2.60
University st	88	22	56.7	8.06	Great Falls st	58	—9	29.2	1.05
Water Valley st	85	25	57.6	6.85	Hogan st	54	—6	29.6	0.91
Waynesboro st	85	25	57.6	6.85	Martinsdale st	56	—1	29.6	1.70
Woodville st	85	26	62.8	7.94	Mingusdale st	71	—20	32.6	1.70
Yazoo City st	87	25	65.0	5.55	Musselshell st	62	—5	29.2	0.74
Missouri.					Powder River st	64	—17	27.8	2.83
Appleton City st	82	12	48.84	2.80	Red Lodge st	57	3	29.8	1.43
Arlington st	82	12	48.84	2.80	Virginia City st	57	3	29.8	1.43
Arthur st	82	12	48.84	2.80	Nebraska.				
Bagnell st	82	7	44.7	2.78	Agoo st	80	—4	34.4	1.67
Big Piney	82	14	51.0	5.14	Arboretum st	80	—2	40.7	0.44
Birch Tree	82	13	51.5	2.83	Ashland st	84	5	44.3	0.62
Bluffton st	82	13	51.5	2.83	Ashton st	80	—4	36.5	0.43
Boonville st	84	11	47.3	0.39	Bassett st	76	—9	34.6	0.78
Carrollton st	81	13	47.6	2.59	Beatrice st	84	8	42.6	0.96
Conception	79	8	38.6	4.25	Beaver City	84	4	43.6	0.20
Cowgill	79	8	38.6	4.25	Bratton st	84	6	44.6	0.33
Downing	79	8	38.6	4.25	Burwell st	66	6	40.8	0.33
East Lynne st	74	18	49.9	3.37	Callaway st	77	1	39.9	0.80
Edge Hill st	74	18	49.9	3.37	Cornelia	77	1	39.9	0.80
Eight Mile st	79	10	47.2	2.70	Creighton st	84	—1	35.8	1.46
Eldon st	82	14	49.0	3.10	Crete	84	6	44.6	1.46
Emma st	82	14	49.0	3.10	Culbertson	78	—3	36.8	0.30
Fairport	84	—2	39.4	0.80	David City st	78	—3	36.8	0.30
					Ericson st	84	—2	39.4	0.80

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
Nebraska—Cont'd.					N. Hampshire—Con.				
Ewing†	82	—8	44.6	0.57	Durham	75	18	40.3	0.99
Fairbury st	82	—5	36.9	1.31	East Canterbury	62	11	35.4	1.95
Fort Robinson	71	—1	38.0	0.80	Grafton	67	10	35.7	1.17
Fort Sidney	73	—1	44.5	0.50	Hanover	63	11	35.9	1.10
Franklin†	85	3	40.5	1.27	Keene	73	10	37.4	1.21
Geneva†	85	3	40.5	0.60	Lakeport	64	2	35.4	1.63
Genoa†	82	3	40.5	0.60	Lancaster	64	2	35.4	1.40
Gering†	73	—1	37.4	0.70	Littleton	61	4	32.9	2.03
Glenwood st	87	—5	30.6	0.20	Mine Falls	75	16	40.4	0.93
Haigler st	82	—12	38.8	0.20	Nashua	76	16	40.4	0.93
Hartington†	82	—3	38.0	0.58	Newton	75	14	38.6	0.96
Harvard st	84	—2	39.8	0.28	North Conway	66	6	34.5	2.45
Hay Springs†	69	—3	33.7	1.73	Pennichuck St'n	70	14	38.0	0.64
Hebron†	88	5	44.3	0.97	Peterboro	70	14	38.0	0.64
Holdrege st	81	4	37.2	0.60	Plymouth	64	2	31.8	1.84
Indianola st	81	9	40.8	0.70	Sanbornville	68	9	35.2	1.57
Kennedy st	78	—5	36.8	2.55	Stratford	64	—3	33.7	1.44
Kimbark†	74	—2	37.2	1.15	Wiers Bridge	72	—3	32.0	2.30
Lexington†	82	—6	38.3	1.63	Wolfboro	72	—3	32.0	2.30
Lincoln	84	5	43.1	1.13					1.33
Lynch st	80	—2	35.8	0.67	New Jersey.				
Madrid st	74	5	38.0	1.01	Allaire	78	12	44.6	.....
Marquette st	83	7	40.0	0.47	Asbury Park	75	18	43.6	2.26
Minden st	84	0	39.2	0.50	Barnegat	70	15	45.5	2.26
Mullen st	70	4	35.7	1.19	Bayonne	73	20	46.2	1.80
Nebraska City st	80	5	43.1	0.54	Belvidere	72	15	42.2	1.17
Norfolk†	78	—1	40.0	0.49	Beverly†	81	19	46.6	7.92
North Loup st	82	0	41.1	0.92	Billingsport st	74	22	44.6	1.34
Oakdale†	80	—1	38.3	0.58	Blairstown	69	15	41.8	.....
Ogallala†	76	—9	39.6	.....	Boonton	70	16	42.2	1.57
O'Neill st	78	—2	37.0	1.00	Bridgeport	80	22	48.6	1.15
Ough†	.....	.....	.....	0.53	Camden	78	21	46.0	1.82
Plattsmouth†	.....	.....	.....	1.00	Cape May	79	24	46.0	1.36
Ravenna	82	—1	41.4	0.81	Cape May C. H.†	81	22	46.9	1.69
Red Cloud	.....	.....	.....	0.33	Charlotteburg	72	14	39.9	1.69
Santee Agency†	82	—3	39.1	0.81	Chester	75	15	40.7	1.61
Seward st	87	3	43.2	0.25	Deckertown	66	14	40.2	1.71
Springview	78	—6	38.2	0.75	Dover	70	16	41.8	1.09
Stanton st	79	—2	37.5	0.48	Egg Harbor City	81	18	45.3	1.76
State Farm	86	5	44.3	1.24	Elizabeth†	73	20	44.0	1.80
Superior st	81	2	44.0	0.76	Franklin Furnace	67	13	40.2	1.59
Sutton	75	3	41.1	0.64	Franklinville	78	16	45.0	1.99
Table Rock st	86	6	44.0	0.94	Freehold	74	16	44.2	.....
Tecumseh†	83	6	44.1	0.70	Friesburg	.....	.....	.....	1.75
Wallace st	78	10	38.6	1.70	Gillette	69	14	41.4	2.39
Weeping Water st	82	3	39.6	0.39	Hammonilton	.....	.....	.....	2.41
West Point†	87	0	40.6	1.00	Hanover	65	16	42.5	1.61
Whitman st	64	2	27.0	2.30	Highland Park†	71	18	42.9	1.71
Wilcox	.....	.....	.....	0.47	Hightstown	70	20	45.6	2.21
York st	70	6	39.8	1.00	Imlaystown	75	19	46.2	2.05
Neveda.					Junction	.....	.....	.....	1.23
Austin	60	4	34.0	1.63	Lambertville	72	20	45.4	1.57
Battle Mountain st	72	25	42.8	0.28	Millville	83	19	47.8	1.69
Belleville st	78	20	40.5	T.	Moorestown	77	20	46.0	2.14
Belmont	62	0	33.2	0.51	Newark st	69	19	43.1	1.89
Beowawe st	70	20	39.8	0.15	Newark b†	70	19	43.7	1.94
Candelaria	73	15	42.4	T.	New Brunswick a.	76	15	45.0	1.59
Carlin st	62	8	32.5	0.00	New Brunswick b.	74	19	42.9	1.59
Carson City	72	10	40.8	0.97	Newton	68	15	40.9	1.37
Cranes Ranch	.....	.....	.....	0.99	Ocean City	70	20	44.4	1.42
Downeyville	88	15	45.2	0.50	Oceanic	70	24	46.3	2.21
Edgewood	57	—8	31.1	1.00	Patersan	74	20	45.0	1.65
Elko st	60	12	33.1	0.30	Pensauken	.....	.....	.....	2.11
Ely	62	—11	34.6	4.30	Plainfield	71	19	43.0	2.54
Eureka	75	.....	.....	1.62	Rancocas st	76	20	45.0	1.60
Genoa st	53	10	32.1	2.00	Readington st	72	20	47.4	.....
Goconda st	72	20	41.9	0.15	River Vale	69	14	41.4	1.67
Gold Hill	74	13	41.2	0.55	Salem	80	20	46.5	1.70
Halleck st	60	8	31.5	1.07	Somerville	75	14	43.7	2.07
Hawthorne st	69	22	44.6	0.12	South Orange	68	20	42.9	1.73
Hawthorne b.	71	17	43.4	0.02	Tenafly	71	15	42.8	1.59
Hot Springs st	75	20	41.5	0.00	Toms River	80	17	45.0	2.65
Humboldt st	70	20	40.3	0.00	Trenton	76	20	42.7	1.56
Lewers Ranch	70	9	38.9	1.80	Vineland	83	19	47.9	1.81
Lovelock st	66	30	44.6	0.00	Whiting	82	18	46.8	2.53
McGill st	60	—10	32.9	2.40	Woodbine	80	14	45.0	1.22
Mill City st	72	24	47.1	.....	New Mexico.				
Osceola	.....	.....	.....	2.12	Albert†	80	18	48.0	0.00
Palisade st	68	12	35.8	1.25	Albuquerque†	74	18	45.2	0.18
Palmetto	70	5	36.6	0.60	Alma†	76	18	46.0	0.77
Paradise	71	16	39.2	0.16	Chama†	71	—2	35.6	2.60
Reno st	72	19	44.3	T.	Coolidge†	.....	.....	.....	0.20
Reno State Univ'ty.	71	12	39.1	0.22	Deming st	84	31	53.3	0.45
Saint Clair	73	16	40.6	0.06	East Las Vegas†	71	12	41.6	0.04
Stofel	60	—13	24.9	5.28	Folsom†	73 ^d	5 ^d	39.8 ^d	0.10
Sunnyside	72	0	41.1	1.20	Fort Bayard	77	14	44.2	0.05
Tecoma st	66	12	34.6	T.	Fort Stanton†	77	14	43.2	0.27
Toano st	52	0	31.2	1.27	Fort Wingate	73	8	39.0	1.30
Tybo	68	0	38.3	0.80	Galisteo†	69	18	42.2	T.
Verdi st	68	5	39.3	1.50	Gallinas Spring†	77	12	46.0	T.
Virginia City	66	12	38.0	1.40	Halls Peak†	68	2	36.6	0.12
Wadsworth st	84	16	40.1	0.00	La Luz†	75	23	48.3	0.77
Wells st	62	—5	33.0	2.32	Las Cruces†	85	15	48.8	0.26
Winnemucca st	66	21	39.0	0.37	Lordsburg st	85	32	50.1	0.20
New Hampshire.					Los Lunas†	78	18	46.5	0.25
Alstead st	65	9	34.1	1.33	Monero†	60	4	32.1	0.74
Andover	.....	.....	.....	1.18	Olio†	75	17	45.3	0.47
Belmont	.....	.....	.....	0.81	Poquaque	78	8	40.0	0.27
Berlin	63	3	32.9	.....	Raton†	86	18	51.4	0.30
Berlin Mills	65	2	32.2	2.28	Rincon†	79	25	49.0	0.20
Bethlehem	62	3	33.0	1.50	San Marcial†	73	22	49.4	0.55
Brookline st	74	18	40.1	1.22	Socorro†	83	11	44.1	0.05
Concord	67	11	36.2	1.16	Springer†	72	4	39.4	0.78
Dublin	67	10	36.4	0.91	Sulphur Hot Sp'gs†	60	—10	30.8	0.78
					Taos†	72	4	39.4	0.91

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean.			Max.	Min.	Mean.	
New York.	°	°	°	In.	N. Carolina—Cont'd.	°	°	°	In.
Addison.....	70	8	39.9	1.06	Mount Airy.....	84	16	50.6	0.86
Akron.....	70	7	37.2	1.35	Mount Pleasant.....	86	19	56.2	1.63
Alfred Center.....	72	7	37.2	1.35	Murphy.....	76	22	54.2	3.03
Angela.....	72	10	38.0	1.78	Newbern.....	76	22	54.2	3.15
Arden.....	72	10	37.3	1.83	Oak Ridge.....	85	17	53.6	0.78
Arkwright.....	70	14	37.8	1.14	Pittsboro.....	84	19	52.4	1.19
Atlanta.....	72	12	36.9	1.14	Raleigh.....	86	25	57.8	2.30
Baldwinsville.....	72	12	36.9	1.14	Rockingham.....	88	20	57.9	1.25
Bedford.....	62	10	37.2	1.27	Roxboro.....	86	22	54.0	2.07
Big Sandy.....	68	14	39.8	1.51	Rutherford Co. #1.....	88	10	49.5	1.18
Binghamton.....	68	14	39.8	1.51	Salisbury.....	85	22	56.2	1.32
Bolivar.....	68	14	39.8	1.51	Salisbury.....	85	22	56.2	1.32
Boonville.....	68	14	39.8	1.51	Saxton.....	89	14	52.4	0.97
Bovina Center.....	68	14	39.8	1.51	Shelby.....	88	23	56.2	2.95
Brentwood.....	68	14	39.8	1.51	Sloan.....	79	18	52.8	4.33
Brookfield.....	68	14	39.8	1.51	Socastone Mt. #1.....	84	17	53.4	1.76
Charlotte.....	68	14	39.8	1.51	Southern Pines.....	91	20	58.7	1.44
Cherry Creek.....	68	14	39.8	1.51	Tarboro.....	91	21	57.2	2.64
Cooperstown.....	68	14	39.8	1.51	Washington.....	93	24	57.8	3.01
Cortland.....	64	9	35.5	1.59	Weldon.....	87	23	54.3	2.13
De Kalb Junction.....	64	9	35.5	1.59	Wilkesboro.....	88	20	55.0	1.76
Demster.....	64	9	35.5	1.59	North Dakota.	69	-21	25.7	1.55
Eden Center.....	80	9	38.3	2.83	Ashley.....	65	-18	26.5	1.95
Ellis.....	76	16	41.7	1.05	Berlin.....	65	-12	23.0	1.82
Elmira.....	76	16	41.7	1.05	Churchs Ferry.....	53	-12	21.2	0.95
Flamingo.....	72	13	40.4	1.35	Devils Lake.....	48	-19	22.5	0.94
Flory.....	72	15	38.2	0.88	Dickinson.....	52	-16	24.4	1.20
Fort Niagara.....	74	15	38.2	0.88	Fargo.....	54	-14	30.5	1.88
Friendship.....	74	15	38.2	0.88	Forman.....	61	-9	39.2	3.05
Glens Falls.....	73	10	37.5	1.60	Fort Berthold.....	59	-13	24.4	1.95
Gloversville.....	69	10	37.6	1.58	Fort Stevens.....	59	-9	26.2	2.13
Hess Road St. #1.....	64	17	39.1	1.43	Gallatin.....	50	-12	25.3	1.05
Honeymead Brook.....	75	10	39.1	1.59	Grafton.....	50	-11	24.0	1.05
Humphrey.....	75	9	38.5	1.27	Grand Forks.....	47	-9	26.1	0.82
Ithaca.....	70	14	40.3	1.28	Jamestown.....	51	-9	27.2	0.81
Jamestown.....	67	15	41.3	1.32	Kelso.....	59	-9	27.2	1.20
Kings Station.....	73	12	37.4	0.96	Larimore.....	57	-13	25.7	0.80
Lebanon Springs.....	73	12	37.4	0.96	Lemert.....	57	-13	25.7	0.80
Le Roy.....	74	13	38.1	2.41	McKinney.....	46	-19	21.3	1.42
Lockport.....	74	13	38.1	2.41	Milton.....	52	-12	25.8	1.30
Lowville.....	75	15	39.2	1.72	Minto.....	57	-12	25.4	0.77
Lyons.....	73	17	35.0	2.03	Napoleon.....	57	-15	25.4	1.25
Madison Barracks.....	70	13	38.2	2.17	New Salem.....	65	-16	27.5	0.45
Malone.....	66	10	34.5	1.58	Oakdale.....	56	-16	26.0	2.55
Middletown.....	68	10	35.0	1.65	Oran.....	57	-11	24.8	0.50
Minneapolis.....	65	10	35.5	1.65	Power.....	60	-13	26.2	1.47
Mount Morris.....	75	13	38.9	1.52	Saint Johns.....	47	-13	19.8	2.59
Newark Valley.....	68	8	35.9	2.68	Sheyenne.....	54	-10	25.5	0.90
New Lisbon.....	70	10	37.4	3.40	Valley City.....	60	-12	27.0	1.87
North Hammond.....	60	1	32.9	1.86	Wahpeton.....	66	-15	26.2	3.82
Number Four.....	67	8	35.5	1.80	Washburn.....	66	-15	26.2	3.82
Ogdensburg.....	67	8	35.5	1.80	Wild Rice.....	66	-15	26.2	3.82
Oxford.....	66	3	36.8	0.99	Woodbridge.....	43	-22	17.9	0.60
Palermo.....	70	13	37.2	1.89	Ohio.	73	14	44.3	2.23
Perry City.....	68	12	37.3	1.03	Akron.....	79	12	44.8	1.76
Phoenix.....	68	12	37.3	1.03	Annapolis.....	72	14	43.4	1.84
Pine City.....	66	5	34.2	1.91	Arcanum.....	84	13	47.1	2.49
Plattsburg Bks.....	67	15	39.1	1.72	Ashland.....	74	10	47.7	1.19
Port Jervis.....	64	5	35.5	1.21	Athens.....	74	8	43.3	3.54
Potsdam.....	64	5	35.5	1.21	Batavia.....	84	12	47.6	3.03
Poughkeepsie.....	72	10	40.0	0.58	Benton Ridge.....	77	6	45.0	1.94
Romulus.....	69	20	39.2	1.70	Bethany.....	78	12	44.5	2.10
Rondout.....	66	3	32.9	2.04	Binola.....	76	12	45.2	3.27
Saranac Lake.....	66	21	41.8	1.34	Bissella.....	75	11	42.4	2.39
Setauket.....	72	8	38.4	1.64	Bloomington.....	77	12	43.5	3.46
South Canisteo.....	67	4	35.7	1.25	Bowling Green.....	78	3	43.2	1.73
South Cortright.....	71	15	38.0	1.30	Bucyrus.....	74	10	43.0	2.65
Stillwater.....	71	15	38.0	1.30	Caledonia.....	81	15	43.9	2.49
Turin.....	57	4	32.3	2.12	Canal Dover.....	78	16	46.1	3.30
Varysburg.....	72	18	39.4	0.87	Canton.....	74	15	43.7	1.94
Wappingers Falls.....	72	18	39.4	0.87	Cardington.....	75	10	43.3	1.94
Warwick.....	73	9	38.6	1.00	Carrollton.....	80	12	45.0	2.29
Wedgwood.....	73	9	38.6	1.00	Cedarville.....	80	14	47.3	1.95
West Chazy.....	72	11	38.2	1.33	Colina.....	86	12	46.3	2.09
West Point.....	65	25	42.8	2.03	Cherry Fork.....	81	15	46.2	2.71
Willetts Point.....	65	25	42.8	2.03	Circleville.....	76	14	44.0	2.00
North Carolina.	84	11	50.5	1.56	Clarksville.....	76	14	44.0	2.00
Asheville.....	90	23	56.5	1.82	Coalton.....	85	8	46.5	2.02
Auburn.....	90	23	56.5	1.82	Colebrook.....	80	14	47.4	2.15
Baileys.....	80	18	55.8	0.86	Cynthiana.....	80	14	47.4	2.15
Bakersville.....	80	18	55.8	0.86	Dayton.....	79	10	44.7	1.63
Blowing Rock.....	68	5	45.2	1.19	Dehance.....	79	12	46.3	1.94
Bryson City.....	88	19	55.7	1.78	Demon.....	79	12	46.3	1.94
Chapel Hill.....	88	19	55.7	1.78	Dupont.....	75	9	43.0	1.68
Columbus.....	78	18	51.6	1.39	Ellsworth.....	75	9	43.0	1.68
Curruck Inlet.....	86	20	55.8	1.79	Elyria.....	75	9	43.0	1.68
Experiment Farm.....	86	20	55.8	1.79	Fairport Harbor.....	75	20	42.2	2.31
Fair Bluff.....	90	27	57.1	4.77	Findlay.....	76	9	43.7	2.09
Falkland.....	90	27	57.1	4.77	Fosteria.....	81	15	46.2	1.92
Fayetteville.....	88	19	55.4	1.90	Frankfort.....	74	11	40.7	2.52
Forest Hill.....	75	17	49.8	2.42	Garrettsville.....	84	15	48.4	2.86
Greenville.....	88	19	55.4	1.90	Gratiot.....	81	14	45.7	1.80
Henderson.....	74	4	45.8	2.90	Greenfield.....	80	15	46.6	1.28
Highlands.....	77	4	50.4	3.15					
Horse Cove.....	77	4	50.4	3.15					
Lenoir.....	53	18	52.0	1.10					
Lewiston.....	81	26	52.4	0.67					
Lillington.....	82	22	53.6	1.95					
Littleton.....	86	20	53.8	2.01					
Louisburg.....	86	20	53.8	2.01					
Lynn.....	81	16	52.4	0.67					
Marion.....	88	22	58.3	1.97					
May.....	86	19	56.0	1.26					
Mocksville.....	87	16	54.0	0.85					
Morganton.....	87	16	54.0	0.85					

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean.			Max.	Min.	Mean.	
Ohio—Cont'd.	°	°	°	In.	Oregon—Cont'd.	°	°	°	In.
Green Hill.....	77	12	42.6	1.64	Aurora.....	70	32	46.8	9.33
Greenville.....	77	12	42.6	1.64	Aurora (near).....	69	27	44.0	11.51
Guyville.....	85	12	41.4	1.45	Bandon.....	57	32	45.5	18.57
Hackney.....	81	12	46.3	2.36	Beulah.....	67	10	36.6	1.37
Hanging Rock.....	85	13	47.9	1.42	Brownsville.....	74	29	44.9	9.94
Harbor.....	74	18	41.1	1.77	Burns.....	34	-12	26.9	0.70
Hedges.....	75	10	44.2	1.53	Canyon City.....	77	10	40.4	2.31
Hillhouse.....	75	10	41.4	2.96	Cascade Locks.....	68	29	43.4	16.52
Hillsboro.....	85	14	47.4	2.50	Comstock.....	78	30	44.7	11.90
Hiram.....	73	7	41.3	2.62	Cornelius.....	68	24	42.8	10.84
Jacksonboro.....	83	12	46.0	1.70	Corvallis.....	67	29	43.6	8.12
Kenton.....	81	10	47.0	3.11	Corvallis (near).....	67	29	43.6	8.12
Killbuck.....	74	14	43.9	2.52	East Portland.....	69	26	43.9	11.00
Leipsic.....	76	14	43.5	2.30	Eugene.....	64	28	41.8	6.78
Levering.....	73	9	42.0	2.78	Fife.....	64	-8	33.8	9.45
Logan.....	87	12	46.6	2.39	Forest Grove.....	68	27	41.6	9.72
Lordstown.....	75	10	42.2	2.32	Gardner.....	62	31	45.4	13.63
Lowell.....	84	15	47.5	2.21	Glenn.....	64	24	39.1	25.63
McArthur.....	84	10	46.2	2.30	Grants Pass.....	74	24	45.0	4.94
McConsville.....	83	13	46.4	2.10	Grants Pass (near).....	71	28	46.8	5.03
Manfield.....	75	10	42.2	2.59	Happy Valley.....	66	11	35.8	1.48
Marietta.....	78	18	50.1	2.00	Heppner.....	66	28	41.8	2.76
Marion.....	78	18	50.1	2.00	Hood River.....	68	25	42.4	17.21
Milford.....	75	9	42.3	2.91	Hood River (near).....	63	25	39.3	12.67
Milligan.....	75	9	42.3	2.91	Hubbard.....	68	29	44.4	9.30
Millport.....	74	12	45.0	2.07	Jacksonville.....	74	22	44.2	4.56
Montpelier.....	74	8	41.1	1.98	Junction City.....	67	30	44.4	8.70
Napoleon.....	81	9	43.0	2.21	Klamath Falls.....	67	30	44.4	1.90
Nelsonville.....	81	12	48.0	1.92	Lafayette.....	66	30	43.8	11.55
New Alexandria.....	76	13	45.9	2.73	La Grande.....	64	14	38.4	1.72
New Berlin.....	73	12	43.3	1.68	Langlois.....	70	32	48.0	20.65

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
<i>Pennsylvania—Con.</i>					<i>S. Dakota—Cont'd.</i>				
Le Roy t.	64	10	38.0	1.00	Gale t.	70	-14	29.4	2.01
Lewisburg.	68	16	42.5	1.13	Gary t.	76	-8	32.0	2.10
Ligonier.	78	4	42.8	2.29	Greenwood.	79	-1	37.0	0.77
Lock Haven t.	74	13	42.5	0.84	Highmore *†	72	-12	30.6	2.20
Lock No. 4 t.				1.95	Hotch City t.	69	-17	34.2	1.47
Lyeippus.	77	11	45.0	2.31	Howard t.	79	-6	35.2	1.27
Mahoning t.				2.55	Kimball t.	80	-7	35.0	1.30
Newcastle t.	75	13	42.8	1.47	Midland t.	76	-8	35.2	2.40
Oil City t.				1.90	Millbank t.	77	-7	33.2	2.31
Ottaville.				1.56	Northville *†	64	-14	29.8	1.53
Parker t.				2.09	Oelrichs t.	72	-14	33.2	4.31
Philadelphia.				1.68	Parker t.	80	-4	35.6	1.77
Philadelphia b.	80	20	47.3	1.64	Piedmont.				5.59
Philadelphia c.	76	21	45.9	1.70	Rosebud t.	70	-4	35.8	2.46
Phoenixville.	78	16	45.3	1.76	Shiloh t.	68	-18	30.8	1.75
Point Pleasant.				1.39	Sioux Falls t.	80	-4	36.0	0.57
Pottstown.	80	20	45.4	1.74	Spearfish t.	70	-9	31.6	7.40
Quakertown.	73	16	42.0	1.68	Tyndall t.	81	-3	41.6	0.50
Reading t.				1.32	Vermillion t.	84	-2	40.9	0.52
Ridgway t.				1.53	Watertown t.	78	-8	33.5	1.32
Saegertown.	75	-2	41.0	1.74	Webster t.	77	-13	31.4	3.52
Salem Corners.	66	14	39.6	1.73	Wentworth t.	79	-10	31.3	1.04
Salisbury t.				2.10	Wessington Sp'gs t.	82	-8	35.0	1.49
Seisholtzville.				1.40	<i>Tennessee.</i>				
Selins Grove.	74	16	42.6	1.09	Andersonville *†	80	15	51.6	2.21
Shinglehouse.	72	11	38.8	1.84	Ashwood *†	79	20	53.6	3.61
Smithport.	75	7	39.0	1.86	Bolivar *†		24	51.0	7.83
Smiths Corners.				1.71	Bristol t.	81	12	48.5	1.77
Somerses.	74	8	43.6	1.85	Byrdstown *†	84	11	50.6	2.15
South Eaton.	67	14	41.2	0.80	Carthage t.				3.71
State College.	69	13	42.7	1.14	Charleston t.				3.85
Stoyestown t.				1.48	Clarksville.	82	17	53.3	3.87
Swarthmore.	78	18	46.1	1.34	Clinton t.				3.14
Uniontown.	76	16	45.8	2.90	Columbia t.				3.66
Warren t.				1.87	Covington a†	78	22	54.6	9.49
Wellsville.	73	10	38.3	0.24	Florence Station *†	79	21	53.5	3.94
West Chester.	77	18	45.1	1.67	Franklin t.	82	15	52.3	4.29
West Newton t.				2.16	Greenville t.	82	12	52.6	1.73
Westtown.	77	18	43.7	1.60	Harrisburg t.	83	15	51.0	2.86
Wilkesbarre t.	70	16	43.8	1.68	Harrogate t.	79	17	51.7	2.29
York t.	80	16	45.1	1.58	Hohenwald.	82	12	53.0	4.12
<i>Rhode Island.</i>					Jacksboro *†	83	15	49.5	2.42
Bristol.	58	20	40.2	1.10	Jackson *†	78	20	52.7	5.70
Kingston.	60	14	40.0	1.93	Johnson City t.	81	16	51.1	
Lonsdale.				1.25	Kingston t.				2.33
Newport.	64	20	43.8		Loudon t.				2.61
Pawtucket.	66	22	41.6	1.19	Lynnville.	81	19	52.1	4.59
Providence a.	66	22	43.7	1.33	Missionary Ridge *†				53.1
Providence c.	66	18	40.8	1.43	Newport *†	84	14	40.6	2.18
<i>South Carolina.</i>					Nunnally t.	80	20	54.6	4.15
Aiken.	88	25	61.4	2.25	Palmetto t.				4.33
Anderson t.				2.17	Parkville *†	80	19	54.5	2.98
Blackburg.	83	20	55.9	1.15	Ridgely t.	78	20	49.8	2.98
Blenheim *†				2.3	Rockwood t.				2.90
Camden t.				1.71	Rogersville *†	81	20	50.3	2.01
Central t.				1.73	Ruby t.	80	12	48.6	2.43
Cheraw a†	90	23	58.6	1.31	Savannah *†	81	22	56.2	5.19
Cheraw b†				1.87	Springdale t.	84	17	54.6	2.55
Clemson College t.				2.80	Strawberry Plains t.				1.21
Conway t.				2.81	Trenton.	80	19	52.8	6.57
Coronaco t.				1.58	Tullahoma *†	76	15	48.3	4.90
Cross Hill *†	84	22	57.8	2.02	Waynesboro *†	78	16	51.4	4.70
Darlington *†	88	27	60.4		Wier *†	82	12	51.2	4.10
Edisto t.				2.49	<i>Texas.</i>				
Edinburg t.				2.86	Albany *†	85	30	57.0	1.88
Flint Hill t.	86	23	57.2	1.37	Arlington t.	91	27	58.0	5.26
Gaffney t.				1.59	Arthur City t.				9.53
Georgetown t.	86	29	61.3	1.15	Aurora *†	100	26	59.0	4.89
Greenwood t.				2.30	Austin *†	89	32	63.5	4.84
Greenwood t.				0.93	Belton t.	90	30	62.2	4.84
Hollands Store t.	86	18	56.0	1.60	Boerne *†	86	27	59.9	1.10
Kingstree t.				2.51	Brady t.	84	24	59.9	1.16
Little Mountain *†	86	23	59.5	0.71	Brasoria t.	88	35	65.5	3.77
Longshore t.	86	20	56.7	1.93	Brenham t.	85	30	63.8	3.95
McCormick *†	84	26	57.8	1.71	Burnet *†	86	29	61.2	2.57
Martins.				3.01	Childress t.	91	17	54.8	1.0
Mount Carmel t.				1.52	Coldwater t.	84	8	44.0	0.10
Pinopolis *†				3.49	Coleman.				2.65
Port Royal t.	82	29	59.3	2.11	Columbia t.	84	34	65.4	4.03
Reidville.	88	22	58.1		Coricana a†	86	25	59.6	4.47
Saint Stephens t.				2.78	Coriscana b†	85	24	59.6	4.47
Santuck *†				1.86	Cuero t.	87	33	65.5	0.65
Simpsonville t.	86	24	56.8	3.27	Dallas t.	90	25	59.8	6.51
Society Hill t.	88	25	59.7	3.09	Devine.	92	30	63.5	0.46
Statesburg t.	87	26	60.4	2.52	Durham t.				0.00
Tatum Station *†	85	26	55.9	1.73	Duval *†	91	30	64.0	3.45
Timmons ville *†	85	40	63.6		Estelle t.	92	30	64.0	5.75
Trenton.	87	26	61.4	2.32	Forestburg t.	92	24	57.4	5.93
Trial t.	89	26	61.7	2.63	Fort Brown t.	88	39	70.5	0.89
Watts *†	84	22	57.7	1.76	Fort Clark.	91	38	66.7	0.00
Yorkville.	86	20	58.4	1.18	Fort Hancock.	86	38	49.0	0.20
<i>South Dakota.</i>					Fort McIntosh.	96	36	70.6	0.00
Aberdeen t.	69	-10	33.0	3.97	Fort Ringgold t.	100	38	70.8	0.00
Alexandria t.	86	-5	37.0	1.69	Fredericksburg *†	91	26	60.2	0.00
Ashcroft t.	66	-23	27.0	2.60	Gainesville t.	91	25	58.0	0.70
Brookings t.	78	-7	34.2	1.23	Graham t.	94	20	57.7	3.51
Castlewood t.	76	-7	31.0	0.80	Grape Vine t.	92	25	59.6	5.64
Cross t.	63	-10	31.8	1.88	Hale Center t.	92	21	53.7	1.64
De Smet t.	85	-8	35.1	0.90	Hallettsville t.	85	33	64.8	1.64
Faulton t.	68	-14	30.0	5.37	Hartley t.	82	11	43.8	2.32
Flandreau t.	80	-6	34.6	1.02	Highland.	96	22	58.7	2.35
Forestburg t.	79	-4	35.6	0.98	Houston t.	85	32	62.4	5.01
Fort Meade.	79	-4	32.7	3.08	Huntsville t.	84	30	62.0	0.00
Fort Sully.	74	-4	34.8	2.60	Kent.				0.00
Frankfort t.	74	-13	32.4	3.20	Kyle *†	34	65.4	2.12	

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
Texas—Cont'd.					Virginia—Cont'd.				
Llano *†	94	29	60.6	0.90	Warsaw †	84	17	49.6	1.01
Longview †	85	28	60.2	7.07	Woodstock †				0.76
Luling †	89	32	65.1	0.72	Wytheville †	76	12	47.5	1.82
McGregor †	78	25	48.4	5.24	Washington.				
Menardville *†	92	27	59.2	0.78	Aberdeen †	72	30	43.4	12.53
Mountain Spring †	91	25	59.0	9.35	Anacortes.				2.56
New Braunfels †	89	32	63.5	1.14	Blaine †	64	24	40.8	5.33
Orange †	80	34	64.4	3.09	Bridgeport †	66	18	43.2	0.96
Paris †	85	26	58.0	7.64	Chehalis †	68	27	42.0	6.86
Rockport *†	80	38	64.4		Colfax †	60	24	39.0	4.99
Rock Springs †				0.97	Connell †	69	23	43.7	0.68
Round Rock †	94	26	63.8	3.32	Davenport †	60	9	37.2	1.21
San Marcos †				1.84	Dayton †	66	21	42.3	5.60
Sierra Blanca †	81	18	52.6	0.00	East Sound †	60	31	42.6	3.12
Silver Falls †	87	16	53.3	T.	Elbe.				9.75
Temple †	87	26	59.7	4.63	Ellensburg †	57	18	35.2	1.03
Victoria *†	86	38	65.6	2.12	Ferry †	65	30	42.8	8.91
Waco †	87	22	60.4	7.05	Fort Simcoe.	67	20	42.7	2.18
Weatherford †	91	25	57.6	4.20	Fort Spokane.	65	19	39.4	7.12
Wichita Falls †	86	23	60.0	2.29	Fort Townsend.	61	26	41.4	1.92
Utah.					Hunters †	51	7	30.6	2.06
Blue Creek *†	69	24	36.4	0.95	Kennewick †	66	27		0.54
Castle Gate †	63	8	36.0	1.78	Lakeside †	58	23	38.9	1.19
Cisco †	70	19	45.1	1.02	Lapush †	60	29	41.0	13.14
Coalville †	67	-7	30.4	1.85	Madrona *†	66	28	43.1	7.81
Corinne *†	76	20	36.6	1.85	Moxee Valley †	70	16	41.6	1.61
Deseret †	75	9	42.0	0.53	Olga †	57	30	41.8	3.78
Fillmore †	75	3	41.0	1.04	Pine Hill *†	67	28	41.5	8.10
Fort Du Chesne †	68	10	39.4	0.56	Pomeroy †	68	23	42.5	4.27
Glendale *†	69	9	39.6	1.33	Pullman †	58	18	35.8	3.17
Grouse Creek *†	60	-4	30.0	1.93	Rosalie †	60	12	36.4	3.17
Heber †	68	-7	33.3	1.65	Silver Creek *†	70	28	41.0	7.53
Kelton *†	72	4	41.8	1.30	Snohomish †	68	27	43.2	5.75
Koosharem.	63	-5	32.7	0.97	Stillaguamish †	67	25	39.8	4.05
Levan †				1.20	Tacoma †	65	27	42.2	6.76
Loa †	66	-7	34.5	1.41	Union City *†	58	28	38.1	12.93
Logan †	58	10	32.8	1.81	Vashon †	65	18	36.8	5.78
Loose †	69	6	38.8	1.40	Waterville *†	55	1	30.6	1.40
Manti †	72	10	37.2		Wenatchee Lake †	53	8	30.7	4.00
Moab †	79	17	48.0	0.74	West Ferndale.	63	23	41.0	3.13
Mount Pleasant *†	65	10	39.4	1.70	West Virginia.				
Ogden *†	70	20	39.1	2.45	Beverly †	82	6	46.1	0.78
Ogden *†	68	23	41.8	1.43	Blomery †	78	10	40.7	2.34
Parowan †	69	6	38.5	2.65	Bluefield †	78	9	47.3	1.80
Promontory *†	62	10	32.9	0.70	Buckhannon a †				2.63
Provo City †				1.30	Buckhannon b †	82	13	45.6	
Randolph †	56	-14	26.2	1.85	Burlington †	78	11	45.7	T.
Richfield †	84	12	41.6	1.25	Charleston †				1.94
Saint George †	85	14	50.0	0.18	Cloverdale †				1.14
Sciofield †	64	-22	27.7	1.96	Davis †	79	1	40.9	2.82
Silver Lake *†	50	-9	25.0	7.60	Elkhorn †	80	13	49.6	1.92
Singletree †	62	-3	32.7	0.82	Ella †	79	13	45.8	2.83
Snowflake †	63	3	33.4	2.08	Fairmont †				1.81
Soldier Summit †	61	10	32.2	3.40	Glennville †	82	14	45.6	1.93
Terrace *†	65	20	41.9	1.10	Grafton †	83	15	46.5	1.82
Thistle †	70	-3	37.0	1.50	Harpers Ferry †				1.11
Vermont.					Hinton †				1.34
Brattleboro.	76	14	39.5	1.06	Marlinton †	78	5	41.1	1.84
Burlington †	61	10	37.7	1.31	Martinsburg †	81	18	45.2	1.26
Conwall.	59	7	36.4	0.45	Monarch *†	83	18	48.8	
Enosburg Falls †	64	7	35.9	2.40	Morgantown a †				1.57
Hartland †	68	10	34.9	1.31	Morgantown b †	85	15	44.8	
Irasburg †	59	3	31.2	2.20	New Martinsville †	88	17	49.6	2.77
Jacksonville.	65	6	32.6	2.19	Parkersburg †	84	17	47.3	2.31
Norwich *†	63	7	34.8	1.18	Phillipi †				1.75
St. Johnsbury.	60	5	33.1	2.30	Pleasant Hill *†	74	5	39.6	3.05
Simonsville.	64	5	32.6		Point Pleasant †	83	17	50.0	2.36
Stratford *†	58	4	33.3	1.10	Raleigh †	80	8	43.6	0.82
Vernon *†	72	16	37.7	1.28	Rowlesburg †				2.75
Wells.	62	6	35.1	1.54	Sandyville *†	84	14	43.8	1.25
Woodstock.	67	6	35.6	1.50	Spencer †	78	10	45.6	1.22
Virginia.					Tannery *†	78	12	46.5	
Abingdon †				2.19	Weston a †				1.98
Alexandria.	84	20	49.8	0.89	Weston b *†	79	16	47.5	
Ashland †	90	18	53.0	1.52	Wheeling a †				1.92
Avon †	87	11	49.4	0.77	Wheeling b †	81	19	49.5	2.35
Bedford City †	82	18	51.2	0.68	Wisconsin.				
Big Stone Gap †	82	12	46.8	2.34	Amherst.	75	5	35.6	2.08
Birdsnest *†	85	26	50.8	3.15	Baraboo †	75	3	39.2	1.70
Blacksburg.	79	13	46.2	1.00	Barron †	65	-3	31.1	2.44
Buchanan †				0.50	Bayfield.	51	3	30.1	5.09
Cape Charles *†	80	17	49.1	2.31	Beaver Dam.	70	4	39.1	3.39
Charlottesville.	85	17	51.6	0.86	Belleville.	75	-2	37.3	2.53
Christiansburg †	85	13		0.33	Beloit.	73	8	40.6	2.94
Clarksville †				1.75	Black River Falls †	79	0	36.3	1.60
Dale Enterprise †	82	10	47.2	0.50	Butternut †	62	-11	28.1	3.23
Danville †				1.29	Cadis †		8	36.0	2.55
Falls Church †				1.02	Centralia.	73	5	35.2	1.08
Fredericksburg †	86	16	50.0	1.38	Chilton.	70	6	37.8	2.48
Hampton.	85	23	51.6	2.97	Chippewa Falls †				1.38
Hot Springs.	76	9	45.2	1.01	City Point.	76	2	36.8	1.39
Irwin †	82	16	50.4	1.38	Crandon †	63	0	30.4	2.12
Lexington †	84	11	46.9	0.61	Delavan †	75	2	39.8	2.70
Marion †	78	12	48.2	2.83	Eau Claire.	75	3	35.2	2.93
Nottoway.	88	16	52.5	1.83	Estella †	72	-1	32.2	1.93
Petersburg †	86	20	53.4	2.02	Florence †	62	-2	31.2	1.37
Richmond a †	92	15	53.6	1.39	Fond du Lac †	71	8	38.7	1.87
Richmond b †				1.32	Grantsburg †	73	-4	33.2	2.40
Riverton †				1.24	Hartford *†				2.22
Salem †	82	18	51.1	0.95	Harvey †	73	6	37.8	1.56
Saluda †	87	21	51.4	1.90	Hayward †	68	-9	30.0	1.90
Spottsville †	83	21	51.0	2.59	Hillsboro.	78	6	37.0	1.48
Stanardsville †	84	18	50.3	0.69	Janesville.	75	8	39.2	2.26
Staunton †	84	14	48.4	0.42	Juneau †	70	7	39.2	1.97
Stephens City †	80	16	47.6	0.87	Koeppenick *†	68	0	31.8	1.80

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
Wisconsin—Cont'd.	°	°	°	In.	Wisconsin—Cont'd.	°	°	°	In.
Lancaster †.....	79	5	36.6	2.09	Waukesha †.....	72	6	38.9	2.49
Lincoln †.....	72	3	36.4	1.73	Westfield †.....	73	2	37.9	1.60
Manitowoc †.....	57	3	35.3	2.39	Weston †.....	78	6	32.5	2.05
Meadow Valley †.....	71	5	34.1	1.16	Whitehall †.....	74	5	37.8	1.94
Medford †.....	66	—	32.5	1.95	Wyoming.				
Medford †.....	77	—	31.3	3.02	Big Horn Ranch †.....	57	—	25.8	3.20
Menomonie †.....	72	3	34.8	1.64	Camp Pilot Butte †.....	62	—	31.0	0.46
New Holstein †.....	73	3	37.8	3.59	Fort McKinney.....	63	—	29.1	1.55
Oconomowoc †.....	72	3	40.3	1.53	Fort Washakie.....	63	—	31.5	2.07
Oconto †.....	71	3	36.0	2.13	Fort Yellowstone †.....	48	—	18.2	1.66
Oshkosh †.....	73	—	31.6	2.80	La Barge †.....	54	—	32.6	3.06
Pepin †.....	70	3	39.1	1.68	Lander.....	58	—	29.4	0.84
Portage †.....	81	1	34.6	1.57	Laramie.....	55	—	29.6	2.30
Port Washington.....	62	8	37.5	1.83	Saratoga †.....	55	3	27.5	3.15
Prairie du Chien.....	82	1	37.6	1.99	Sundance.....	64	—	26.0	0.50
Racine * ¹⁰	60	5	36.6	2.70	Wheatland †.....	54	—	36.8	0.90
Raymond.....	75	9	38.8	1.97	Canada.				
Reedsburg †.....	75	7	39.0	3.65	Fort Francis, Ont..	53	—16	24.4	2.55
Sharon †.....	66	4	35.4	1.31	Mexico.				
Shawano.....	55	8	37.2	0.95	Cuidad P. Diaz.....	95	36	68.0	0.10
Stevens Point †.....	66	4	36.0	0.95	Leon de Aldamas.....	84	40	62.8	0.12
Valley Junction †.....	77	4	37.5	1.39	Mazatlan.....	79	54	66.0	0.00
Viroqua.....	74	3	36.4	3.13	Mexico.....	78	40	60.3	0.20
Watertown †.....	75	2	37.2	1.13	Puebla.....	78	43	61.2	0.03
					West Indies.				
					Grand Turk Island.				0.05
					Hamilton, Ber.....	74	54	65.4	2.49

Reports received too late to be used in general discussion of weather for March, 1894.

California.					Massachusetts.				
Cloverdale * ¹	75	34	54.3	2.35	Medford.....			0.95	
Colorado.					Monroe.....	64	7	35.0	2.59
Garnett.....				0.03	Oregon.				
Glen Eyrie †.....	67	7	38.6	1.36	Lakeview †.....	59	0	29.8	3.18
Springfield †.....				0.00	Vernonia * ¹	69	26	40.5	12.79
Virginia.					South Dakota.				
Griffin.....	85			5.85	Bowdle * ¹	61	—10	30.1	2.80
Kansas.					Parkston †.....	79	—6	32.9	1.01
Ellis * ²	80	12	46.1	0.05					
Wa Keeney * ¹	80	16	42.2	0.05					

Received too late for publication in February, 1894.

California.					New York.				
Point George L. H.....				4.57	Lyons.....	46	—3	22.8	2.55
Wenrich Ranch.....				1.46	Ohio.				
Colorado.				0.60	Bement.....	55	—4	23.4	2.10
Kansas.				0.50	Burns †.....	44	—32	12.4	1.70
Beloit †.....				0.85	Fife †.....	44	25	22.4	0.80
Ness City †.....				0.85	Utah.				
Mississippi.					Singleton * ¹	50	—3	21.4	.....
Logtown †.....	76	30	52.2	11.61	West Virginia.				
Missouri.					Ella †.....	59	7	30.5	3.31
Warrensburg * ¹	58	1	29.5	1.53	Monarch * ¹	67	15	38.0	4.03
					Morgantown †.....	70	14	32.6	.....

EXPLANATION OF SIGNS.

*Extremes of temperature from observed readings of dry thermometer.
† Weather Bureau instruments.

A numeral following the name of a station indicates the hours of observation from which the mean temperature was obtained, thus:

¹ Mean of 7 a. m. + 2 p. m. + 9 p. m. + 4.

² Mean of 8 a. m. + 8 p. m. + 2.

³ Mean of 7 a. m. + 7 p. m. + 2.

⁴ Mean of 6 a. m. + 6 p. m. + 2.

⁵ Mean of 7 a. m. + 2 p. m. + 2.

⁶ Mean from readings at various hours reduced to true daily mean by special tables.

⁷ Mean from hourly readings of thermograph.

⁸ Mean of 7 a. m. + 2 p. m. + 9 p. m. + 3.

⁹ Mean of sunrise and noon.

¹⁰ Mean of sunrise, noon, sunset, and midnight.

The absence of a numeral indicates that the mean temperature has been obtained from daily readings of the maximum and minimum thermometers.

An Italic letter following the name of a station, as "Livingston a," "Livingston b," indicates that two or more observers, as the case may be, are reporting from the same station. A small Roman letter following the name of a station, or in figure columns, indicates the number of days missing from the record; for instance, "a" denotes 14 days missing.

No note is made of breaks in the continuity of temperature records when the same do not exceed two days. All known breaks, of whatever duration, in the precipitation record receive appropriate notice.

TABLE III—Data from Canadian stations for the month of March, 1894.

Station.	Pressure.			Temperature.		Precipitation.		Prevailing direction of wind.
	Mean not reduced.	Mean reduced.	Departure from normal.	Mean.	Departure from normal.	Total.	Departure from normal.	
Saint John's, N. F.....	Inches. 29.72	Inches. 29.87	Inches. + .04	° 27.8	° 0.0	Inches. 5.51	Inches. + 0.57	n.
Sydney, N. S.....	29.62	29.96	+ .11	28.8	+ 2.8	5.82	+ 0.57	n.w.
Grindstone, G. S. L.....								
Sandy Point, N. F.....								
Halifax, N. S.....	29.88	30.02	+ .13	32.3	+ 3.8	3.52	— 2.34	n.
Grand Manan, N. B.....	29.96	30.01	.....	34.1	.....	2.68	— 1.47	n.w.
Yarmouth, N. S.....	29.95	30.03	+ .15	34.2	+ 3.2	2.25	— 2.61	n.
Saint Andrews, N. B.....	29.93	29.98	.....	32.5	.....	1.97	— 2.42	n.w.
Charlottetown, P. E. I.....	29.94	29.98	.....	29.3	.....	2.14	— 1.27	s.
Chatham, N. B.....	29.96	29.96	+ .08	27.2	+ 6.2	2.48	— 1.76	w.
Father Point, Que.....	29.92	29.95	+ .05	26.8	+ 7.3	1.15	— 1.31	w.
Quebec, Que.....	29.95	29.99	+ .04	28.0	+ 8.0	4.04	+ 0.13	s.w.
Montreal, Que.....	29.78	30.00	+ .04	31.4	+ 9.4	2.19	— 1.50	s.w.
Rockliffe, Ont.....	29.44	29.97	+ .01	26.3	+ 10.3	1.90	— 0.39	n.w.
Kingston, Ont.....	29.69	30.02	+ .02	33.5	+ 9.5	2.00	— 1.06	s.w.
Toronto, Ont.....	29.64	30.04	+ .01	34.9	+ 9.4	1.37	— 1.23	w.
White River, Ont.....	28.56	29.98	.....	18.2	+ 5.2	0.59	— 0.56	n.
Port Stanley, Ont.....	29.39	30.06	+ .03	34.4	.....	1.62	— 1.33	w.
Saugeen, Ont.....	29.26	30.00	.....	34.2	+ 11.2	2.52	— 0.03	s.
Parry Sound, Ont.....	29.27	29.99	.....	31.0	+ 12.5	3.18	+ 0.56	w.
Port Arthur, Ont.....	29.20	29.93	.....	23.1	+ 9.1	1.53	+ 0.36	n.w.
Winnipeg, Man.....	29.10	29.98	.....	17.2	+ 6.7	1.63	+ 0.61	n.w.
Minnedosa, Man.....	28.06	29.97	.....	13.8	+ 3.8	0.88	+ 0.22	w.
Qu'Appelle, Assiniboia.....	27.62	30.00	.....	15.5	+ 0.5	1.29	+ 0.65	s.
Medicine Hat, Assiniboia.....	27.56	29.95	.....	26.2	— 1.3	0.99	+ 0.38	n.w.
Swift Current, Assiniboia.....								
Calgary, Alberta.....	26.27	29.94	.....	24.0	— 3.0	0.67	— 0.09	w.
Prince Albert, Sask.....								
Edmonton, Alberta.....	27.50	29.95	.....	19.4	— 6.6	0.70	+ 0.05	n.w.
Battleford, Saskatchewan.....	28.14	29.99	.....	10.4	.....	0.70	.....	s.e.
Spences Bridge, B. C.....	29.05	29.90	.....	38.9	.....	0.19	.....	s.w.
Hamilton, Bermuda.....	30.00	30.16	+ .08	64.2	.....	2.39	.....	n.
January, 1894.								
Sandy Point, N. F.....	29.86	29.88	.....	19.4	.....	6.67	.....	n.w.
February, 1894.								
Sandy Point, N. F.....	29.86	29.88	.....	13.8	.....	4.79	.....	n.w.

TABLE IV.—Hourly sunshine as deduced from sunshine recorders, March, 1894.

Stations.	Instrument.	Percentage for each hour of local mean time ending with the respective hour.																Monthly summary.			
		A. M.								P. M.								Instrumental record.			
		5	6	7	8	9	10	11	Noon.	1	2	3	4	5	6	7	8	Actual.	Possible.	Per cent of possible.	Personal estimate.
Baltimore, Md.	T.	25	37	46	66	73	73	75	79	80	76	78	62	46	39	.....	.....	Hours.	Hours.		
Boston, Mass.	T.	33	45	47	52	66	75	76	77	73	62	59	54	36	21	.....	.....	245.1	371.5	66	57
Buffalo, N. Y.	T.	50	24	26	40	48	57	71	77	79	71	61	47	34	13	.....	.....	222.0	359.7	60	41
Chicago, Ill.	T.	25	18	35	50	61	60	65	64	65	61	54	50	34	19	.....	.....	197.0	370.4	53	39
Cincinnati, Ohio	P.	50	58	53	55	51	55	55	61	59	59	62	58	47	24	.....	.....	190.6	371.4	52	51
Cincinnati, Ohio	P.	50	58	53	55	51	55	55	61	59	59	62	58	47	24	.....	.....	206.7	370.3	56	51
Cleveland, Ohio	P.	50	41	54	58	51	56	52	65	65	73	74	63	57	46	.....	.....	219.6	371.2	59	45
Colorado Springs, Colo.	T.	25	37	50	68	83	87	85	80	81	73	63	57	50	39	.....	.....	251.5	370.7	68	50
Columbus, Ohio	T.	33	43	48	59	68	71	72	74	75	73	69	60	55	36	.....	.....	236.8	372.2	64	45
Denver, Colo.	P.	33	57	74	73	77	80	85	79	74	75	78	69	55	48	.....	.....	270.0	370.0	74	49
Des Moines, Iowa	T.	83	55	45	56	60	71	71	72	74	73	72	56	40	32	.....	.....	229.2	370.9	62	51
Detroit, Mich.	T.	25	29	45	59	70	80	83	80	82	75	65	61	53	23	.....	.....	241.7	359.2	66	45
Dodge City, Kans.	P.	35	46	66	82	88	83	79	70	85	82	76	72	55	40	.....	.....	273.6	371.6	74	52
Eastport, Me.	P. ....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Galveston, Tex.	P.	43	20	40	51	57	67	68	69	69	63	58	54	35	35	.....	.....	203.2	373.3	54	34
Kansas City, Mo.	P.	33	60	60	74	77	77	81	77	77	75	68	66	51	35	.....	.....	259.5	370.5	70	55
Key West, Fla.	T. ....	.....	79	71	74	78	85	88	85	80	78	84	86	90	83	.....	.....	304.2	373.6	82	62
Little Rock, Ark.	T.	50	45	48	61	67	69	69	67	63	64	55	49	46	.....	.....	.....	.....	.....	.....	.....
Louisville, Ky.	T.	25	42	63	64	69	74	75	68	68	68	61	45	26	11	.....	.....	222.5	371.7	60	47
Memphis, Tenn.	P.	40	48	53	59	67	69	67	64	65	55	59	65	61	46	.....	.....	226.6	371.7	61	58
New Haven, Conn.	T.	50	27	42	63	70	75	78	80	72	70	65	50	33	17	.....	.....	224.2	370.8	61	40
New Orleans, La.	T.	67	29	29	49	59	64	58	65	64	66	63	55	53	40	.....	.....	204.0	372.8	55	54
New York, N. Y.	T.	8	23	44	65	75	75	75	78	75	72	67	47	20	15	.....	.....	221.0	371.0	60	46
Philadelphia, Pa.	T.	75	52	64	71	69	73	81	77	72	67	65	62	55	30	.....	.....	250.0	370.5	68	47
Portland, Me.	T.	62	20	46	59	68	73	78	81	83	74	69	54	35	12	.....	.....	228.5	369.8	62	45
Portland, Oreg.	P.	27	24	24	21	23	25	21	22	26	28	27	24	22	33	.....	.....	89.2	371.0	24	25
Rochester, N. Y.	T. ....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Saint Louis, Mo.	T. ....	.....	45	43	69	82	87	86	83	86	87	86	77	63	41	.....	.....	276.1	371.6	75	64
Salt Lake City, Utah	T.	50	30	33	42	57	69	80	78	68	65	57	39	22	20	.....	.....	197.9	370.7	53	40
San Diego, Cal.	P. ....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Francisco, Cal.	P.	0	24	34	47	60	70	63	75	79	67	62	64	39	49	.....	.....	212.4	370.5	57	53
Santa Fe, N. Mex.	P.	30	67	79	85	86	82	81	75	78	80	83	77	56	41	.....	.....	286.6	371.7	77	63
Savannah, Ga.	P.	67	61	62	68	76	77	74	67	76	74	75	69	52	54	.....	.....	258.1	372.5	69	60
Tucson, Ariz.	P. ....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Vicksburg, Miss.	T.	67	42	39	58	76	90	82	81	74	77	69	58	47	39	.....	.....	246.0	373.4	66	65
Washington, D. C.	P.	33	48	58	65	67	61	69	70	72	67	65	52	58	57	.....	.....	232.9	370.5	63	60
Wilmington, N. C.	T.	42	43	43	52	64	74	77	76	74	69	68	59	47	39	.....	.....	230.8	371.5	62	64

TABLE V.—Mean temperature for each hour of seventy-fifth meridian time, March, 1894.

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midnight.	Mean.
Abilene, Tex.	53.2	52.4	51.7	50.8	49.6	48.9	48.0	48.1	49.6	52.6	55.9	58.9	61.8	63.6	66.0	67.5	68.3	68.0	66.0	63.2	60.0	57.5	55.7	54.5	57.1
Albany, N. Y.	39.5	35.9	35.8	35.3	35.4	35.2	35.2	36.3	37.5	39.3	41.1	42.9	43.8	44.7	44.7	44.4	43.6	42.4	41.3	40.3	39.4	38.7	38.3	37.5	39.4
Alpena, Mich.	32.8	32.2	31.6	31.0	30.7	30.3	30.5	31.2	32.6	33.8	35.1	36.3	37.7	38.5	38.2	38.5	37.9	36.7	35.7	34.7	34.4	34.2	33.5	33.3	34.2
Amarillo, Tex.	43.5	42.2	40.9	39.9	38.6	37.5	36.5	35.6	35.8	37.7	44.0	47.7	50.8	53.1	54.6	56.0	57.1	57.1	56.5	54.4	50.8	48.1	46.4	45.1	46.3
Atlanta, Ga.	53.5	52.7	51.6	50.9	50.1	49.7	49.6	49.8	51.4	54.7	57.4	60.2	61.4	62.8	64.0	64.8	64.7	63.6	61.6	59.8	58.1	57.2	56.2	55.0	56.7
Augusta, Ga.	56.7	55.7	55.2	54.3	53.6	52.9	52.2	52.9	55.0	58.6	61.7	64.3	66.1	67.3	68.4	69.3	69.3	68.4	66.8	63.4	62.5	61.0	59.6	58.2	60.6
Baker City, Oreg.	33.5	32.7	31.7	31.2	30.5	30.2	30.2	29.8	29.7	30.1	31.7	33.6	36.4	37.5	38.9	39.6	40.1	40.2	39.6	39.0	37.7	36.7	36.0	34.6	34.6
Baltimore, Md.	44.7	43.8	43.1	42.3	41.7	41.2	41.2	43.1	45.2	47.8	50.0	51.4	52.6	54.4	55.0	54.7	53.5	52.5	51.1	50.0	49.0	48.1	47.2	46.2	47.9
Bismarck, N. Dak.	24.2	23.9	23.4	22.7	21.9	21.2	20.8	19.9	20.2	21.7	24.1	26.7	28.3	30.2	31.5	32.0	31.7	31.9	30.8	28.9	26.7	25.5	24.6	23.9	25.7
Boston, Mass.	39.1	38.8	38.6	38.1	38.1	37.9	38.0	39.2	41.1	42.8	44.7	46.0	47.3	47.5	47.3	46.6	44.8	44.1	43.0	41.9	40.4	39.9	39.6	39.1	41.9
Buffalo, N. Y.	37.7	37.3	36.9	36.6	36.3	36.4	36.1	36.9	37.8	38.5	39.5	41.0	41.8	42.0	42.0	41.9	41.8	41.5	40.6	39.8	39.1	38.8	38.0	38.1	39.0
Charleston, S. C.	57.2	56.8	56.5	56.0	55.6	54.9	54.3	54.0	54.8	56.3	58.2	60.4	62.4	64.7	67.0	68.3	68.4	68.2	67.9	67.4	66.8	66.0	65.0	64.0	66.2
Charlotte, N. C.	52.5	51.5	50.6	49.6	48.8	48.2	47.8	49.0	50.8	53.8	56.5	58.7	60.0	62.2	63.3	63.9	64.0	62.9	61.0	59.4	57.8	56.8	55.5	53.8	55.8
Cheyenne, Wyo.	30.3	29.5	28.6	27.8	27.8	27.5	27.2	26.7	28.1	31.4	34.6	37.0	38.5	39.7	41.1	41.6	41.5	40.6	39.2	37.2	34.6	33.4	32.5	31.3	33.6
Chicago, Ill.	39.9	39.4	38.9	38.1	37.5	37.1	36.8	37.4	39.6	43.9	47.1	48.5	49.5	44.4	45.1	45.7	45.9	45.7	44.9	43.9	43.2	42.1	41.2	40.8	41.4
Cincinnati, Ohio	46.6	45.6	44.9	44.3	43.4	42.6	42.0	42.6	44.0	46.1	48.4	50.7	52.3	53.5	54.6	55.4	55.2	54.7	53.6	52.2	50.8	49.8	48.8	47.8	48.7
Cleveland, Ohio	40.3	40.0	39.6	39.0	38.7	38.3	37.4	38.2	39.2	41.5	43.4	44.8	45.9	46.9	47.0	47.2	47.3	46.6	44.8	43.9	43.5	42.7	41.5	41.0	42.4
Colorado Springs, Colo.	33.3	33.5	32.8	31.9	31.5	29.9	29.1	28.7	29.0	32.4	36.9	40.2	42.9	44.9	46.0	47.1	46.8	47.0	45.9	43.6	40.8	38.8	36.3	34.8	37.9
Columbus, Ohio	42.9	42.2	41.5	41.1	40.3	39.6	39.4	40.1	42.0	43.9	46.3	48.1	50.3	51.5	52.8	53.3	53.1	52.2	50.4	49.0	47.3	46.5	45.3	44.3	46.0
Denver, Colo.	38.2	37.3	36.5	35.7	34.5	33.6	32.8	31.9	32.0	34.3	38.1	41.9	44.9	47.0	48.2	49.7	50.2	50.5	49.7	48.4	45.3	43.0	40.8	39.1	41.0
Des Moines, Iowa	40.0	39.5	38.7	37.8	37.3	36.6	35.7	34.9	35.8	38.2	40.6	43.5	46.1	47.9	49.0	49.8	49.8	49.3	48.3	46.1	44.9	43.7	42.3	41.3	42.4
Detroit, Mich.	38.8	37.9	37.5	37.1	36.5	36.0	35.7	36.5	37.4	39.0	40.5	42.1	43.4	44.6	45.1	45.7	45.2	44.6	43.4	42.2	41.3	40.6	39.9	39.3	40.4
Dodge City, Kans.	40.7	39.3	38.4	37.3	36.1	35.0	34.1	33.7	36.0	40.8	45.3	49.2	52.5	54.7	56.8	58.4	58.6	58.4	56.2	50.8	47.1	44.9	43.4	42.3	45.4
Duluth, Minn.	28.6	27.7	26.9	26.5	26.0	25.7	25.3	25.3	25.4	26.5	28.1	29.4	30.2	31.1	31.7	32.4	32.4	32.2	31.9	31.5	31.0	30.9	29.6	28.9	29.0
Eastport, Me.	31.6	31.5	31.3	30.8	30.5	31.2	31.8	32.9	34.1	34.7	35.4	35.9	36.3	36.2	36.0	35.8	35.5	35.5	34.8	34.2	33.5	32.9	32.5	32.2	33.4
El Paso, Tex.	50.7	49.1	47.5	46.0	44.9	43.6	43.2	42.8	43.1	46.5	50.5	54.1	57.3	60.2	62.8	63.8	64.9	65.0	64.8	63.0	59.3	56.6	54.5	52.8	53.6
Fort Smith, Ark.	52.2	51.5	50.6	49.8	49.0	48.4	48.0	48.1	49.7	52.3	55.0	57.4	59.4	61.1	62.2	63.3	64.0	63.6	61.9	58.4	57.0	55.3	54.0	52.5	55.5
Galveston, Tex.	61.4	61.4	60.9	60.8	60.6	60.3	60.5	61.0	62.0	62.9	63.8	64.5	64.9	65.2	64.9	64.6	64.1	63.9	63.3	63.0	62.3	62.0	61.9	62.5	62.5
Grand Haven, Mich.	36.9	36.5	36.0	35.8	35.9	36.0	35.7	35.8	37.1	38.4	39.2	40.6	40.4	40.4	40.3	41.1	41.1	40.4	39.7	39.3	38.8	38.9	37.5	36.3	38.3
Hayre, Mont.	25.0	24.5	23.6	22.9	22.5	22.0	21.2	21.0	20.8	22.7	26.0	28.4	30.4	32.2	34.3	35.3	35.9	36.1	35.7	33.5	30.5	28.3	27.1	25.8	27.7
Helena, Mont.	39.3	39.0	38.1	37.9	37.3	37.2	36.7	35.8	35.5	36.5	38.1	39.4	40.3	40.3	40.3	40.3	40.3	40.3	39.6	38.6	37.0	35.0	33.0	31.0	30.2
Huron, S. Dak.	29.0	28.2	27.2	26.8	26.0	25.9	25.3	25.5	27.2	30.0	33.0	35.7	38.3	40.1	41.4	41.9	41.9	41.1	39.2	36.7	34.1	32.3	30.5	28.7	32.8
Indianapolis, Ind.	45.1	44.5	43.6	42.9	42.4	42.0	41.3	41.6	43.5	45.7	48.0	49.6	51.5	52.6	53.5	54.1	53.8	53.1	51.6	50.4	48.9	47.1	46.3	45.1	47.5
Jacksonville, Fla.	61.2	60.4	59.8	59.3	58.8	58.5	58.4	59.9	62.2	65.2	67.6	69.3	71.0	71.7	72.3	71.5	70.8	69.0	66.8	65.0	63.9	63.2	62.6	61.9	64.6
Kansas City, Mo.	44.9	44.3	43.6	42.6	41.6	40.7	40.2	39.7	40.8	42.9	45.6	48.3	50.4	52.5	53.6	54.4	54.9	54.5	53.4	51.9	50.1	48.9	47.3	46.3	47.2
Key West, Fla.	71.6	71.5	71.4	71.3	71.3	71.3	71.3	72.7	74.1	75.1	76.1	76.5	76.6	76.7	76.4	76.0	75.5	74.5	73.2	72.5	72.3	72.0	71.8	71.7	73.5
Knoxville, Tenn.	50.2	49.3	48.3	47.5	46.6	45.8	45.2	45.8	48.1	51.5	54.0	56.3	58.1	60.0	61.3	62.2	62.3	61.5	59.8	58.2	56.0	53.8	53.1	51.7	53.6
Lander, Wyo.	29.0	28.7	27.6	27.0	26.2	25.8	25.1	24.0	24.9	27.6	31.2	34.2	36.7	38.8	40.2	40.7	41.6	40.9	39.2	36.6	33.7	32.2	30.8	30.0	32.2
Little Rock, Ark.	54.0	53.2	52.3	51.1	50.3	49.7	48.8	48.6	49.9	52.3	54.9	57.1	58.7	60.5	60.6	61.4	61.2	61.0	60.2	58.7	57.9	56.8	55.8	54.9	55.4
Louisville, Ky.	48.3	47.5	46.8	46.1	45.3	44.5	44.1	44.9	47.0	49.7	52.1	54.7	56.9	58.5	59.1	59.3	58.9	57.7	56.2	54.3	53.1	51.8	50.9	49.7	51.6
Lynchburg, Va.	46.2	45.4	44.5	43.7	43.1	42.5	42.5	44.6	48.1	51.4	54.2	56.3	58.6	59.9	60.9	61.3	61.1	60.1	57.4	54.5	52.3	50.7	49.4	48.2	51.5
Marquette, Mich.	29.6	29.0	28.5	27.9	27.3	26.8	26.4	28.7	30.4	30.5	31.2	32.5	33.2	34.2	34.6	33.9	33.0	32.5	31.6	30.0	28.6	27.3	26.0	24.6	26.6
Memphis, Tenn.	53.5	52.6	51.9	51.6	50.9	50.2	49.9	50.0	50.9	53.4	57.2	59.0	60.1	61.1	61.6	61.7	61.5	60.0	58.4	57.3	56.3	55.8	54.7	53.9	55.6
Milwaukee, Wis.	37.2	36.8	36.5	36.0	35.8	35.6	35.2	36.5	37.3	39.2	40.9	41.4	42.9	43.3	43.5	43.1	42.7	41.0	40.1	39.5	38.8	38.0	37.8	37.0	39.0
Montgomery, Ala.	56.9	56.1	55.0	54.5	53.8	52.9	52.6	53.6	55.3	58.0	60.8	63.5	65.9	67.5	68.6	69.1	68.8	68.2	65.8	64.3	62.7	61.5	59.8	58.4	60.6
Moorhead, Minn.	24.8	24.3	23.4	22.8	22.4	21.9	21.6	21.7	23.2	24.9	26.9	29.0	30.8	32.2	33.2	33.5	33.3	32.9	31.8	30.1	28.6	27.5	26.0	25.0	27.2
Nantucket, Mass.	37.5	37.3	37.4	37.5	37.3	37.4	38.2	39.1	40.1	40.4	41.6	42.3	41.8	42.1	41.8	41.2	40.2	39.4	39.4	39.1	38.7	38.2	38.0	37.4	39.4
Nashville, Tenn.	50.7	50.0	49.1	48.5	47.6	46.9	46.5	46.9	48.7	51.3	54.4	56.2	58.4	60.1	61.3	60.9	61.2	60.7	59.3	57.6	56.5	55.4	53.7	52.4	53.9
New Haven, Conn.	37.0	37.2	36.3	36.0	35.6	35.4	35.7	37.8	40.1	41.6	43.5	45.1	46.8	48.6	49.7	49.6	48.4	47.4	46.4	45.4	44.0	43.3	42.6	41.7	40.7
New Orleans, La.	60.5	59.8	59.4	59.2	58.6	58.4	57.7	58.2	59.1	60.9	63.1	64.7	66.0	66.8	67.6	68.3	68.2	67.6	66.2	64					

TABLE VI.—Mean pressure for each hour of seventy-fifth meridian time, March, 1894.

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midnight.	Mean.
Abilene, Tex	28.209	.214	.213	.211	.205	.209	.222	.233	.242	.248	.251	.250	.235	.214	.184	.158	.140	.129	.132	.141	.157	.175	.191	.200	.198
Albany, N. Y.	29.998	.995	.989	.990	.994	.001	.011	.018	.024	.020	.010	.999	.981	.965	.956	.951	.953	.960	.968	.975	.979	.982	.982	.981	.987
Alpena, Mich	29.311	.310	.301	.293	.297	.299	.309	.314	.310	.308	.305	.297	.286	.277	.270	.265	.267	.269	.275	.282	.298	.300	.302	.299	.294
Atlanta, Ga	28.959	.959	.953	.952	.959	.968	.982	.996	.006	.013	.011	.005	.986	.968	.948	.935	.933	.937	.944	.952	.959	.961	.963	.962	.967
Augusta, Ga	29.973	.971	.963	.957	.959	.970	.983	.995	.002	.005	.005	.998	.979	.958	.938	.929	.920	.922	.931	.941	.955	.966	.972	.974	.965
Baltimore, Md.	29.925	.920	.915	.917	.924	.934	.945	.951	.949	.946	.935	.921	.895	.874	.866	.859	.865	.870	.881	.893	.908	.903	.907	.914	.909
Bismarck, N. Dak. ..	28.119	.113	.113	.107	.100	.099	.100	.107	.112	.117	.115	.109	.105	.101	.095	.092	.095	.103	.110	.119	.126	.132	.135	.134	.111
Boston, Mass.	29.936	.929	.925	.924	.931	.937	.945	.949	.947	.943	.931	.922	.901	.893	.885	.884	.891	.898	.908	.915	.921	.921	.923	.920	.920
Buffalo, N. Y.	29.290	.287	.280	.279	.284	.290	.300	.305	.311	.310	.306	.297	.282	.270	.264	.258	.259	.263	.272	.280	.282	.282	.281	.276	.284
Chicago, Ill.	29.111	.109	.103	.100	.098	.106	.117	.125	.127	.132	.130	.121	.114	.098	.082	.075	.073	.074	.081	.087	.094	.101	.110	.111	.103
Cincinnati, Ohio ...	29.412	.410	.405	.402	.405	.415	.430	.447	.452	.455	.450	.443	.426	.406	.392	.384	.385	.389	.395	.403	.410	.410	.414	.412	.415
Cleveland, Ohio	29.251	.249	.244	.243	.248	.256	.265	.266	.266	.268	.267	.259	.248	.228	.223	.217	.217	.222	.231	.239	.244	.246	.245	.244	.245
Colorado Sp'gs, Colo.	23.929	.929	.931	.927	.917	.915	.919	.926	.932	.933	.933	.925	.916	.908	.891	.880	.866	.866	.878	.897	.911	.922	.933	.930	.923
Columbus, Ohio	29.164	.162	.156	.151	.155	.162	.173	.185	.188	.191	.188	.185	.169	.151	.136	.128	.128	.134	.141	.152	.157	.159	.161	.158	.160
Denver, Colo.	24.673	.666	.662	.660	.652	.648	.648	.652	.661	.668	.672	.674	.669	.660	.644	.631	.621	.616	.618	.628	.642	.659	.672	.677	.653
Des Moines, Iowa ...	29.045	.049	.053	.048	.049	.053	.061	.066	.071	.071	.067	.062	.047	.032	.017	.005	.001	.002	.008	.022	.030	.037	.046	.045	.041
Detroit, Mich.	29.244	.245	.236	.232	.236	.239	.249	.254	.257	.261	.256	.249	.235	.221	.214	.212	.208	.212	.219	.228	.236	.238	.240	.238	.236
Dodge City, Kans. ..	27.350	.351	.354	.348	.346	.349	.351	.366	.371	.383	.391	.391	.383	.369	.341	.327	.315	.309	.313	.325	.335	.346	.353	.354	.350
Duluth, Minn.	29.178	.179	.176	.176	.174	.177	.181	.188	.194	.193	.187	.186	.184	.176	.170	.167	.171	.178	.186	.188	.188	.188	.188	.184	.182
Eastport, Me.	29.101	.096	.097	.091	.098	.099	.099	.098	.092	.094	.095	.091	.086	.086	.084	.081	.082	.086	.089	.095	.098	.097	.090	.088	.091
El Paso, Tex.	26.199	.203	.205	.201	.195	.193	.200	.211	.224	.234	.238	.240	.228	.212	.188	.162	.148	.135	.135	.142	.155	.173	.187	.196	.192
Galveston, Tex.	30.064	.062	.054	.045	.039	.045	.059	.069	.083	.089	.095	.092	.078	.060	.040	.025	.015	.017	.022	.027	.039	.053	.057	.061	.054
Grand Haven, Mich. .	30.301	.303	.295	.292	.293	.298	.306	.312	.309	.308	.302	.299	.290	.280	.272	.269	.270	.275	.280	.282	.286	.290	.293	.292	.292
Hayre, Mont.	27.297	.292	.286	.284	.275	.271	.275	.277	.285	.297	.315	.321	.324	.318	.305	.294	.285	.276	.271	.269	.273	.284	.293	.300	.290
Helena, Mont.	25.719	.719	.715	.716	.709	.704	.710	.716	.723	.727	.731	.734	.724	.716	.707	.694	.691	.691	.694	.696	.702	.714	.719	.720	.712
Huron, S. Dak.	28.540	.541	.541	.532	.529	.528	.532	.530	.529	.524	.524	.519	.508	.499	.487	.486	.483	.487	.495	.511	.523	.529	.541	.545	.519
Indianapolis, Ind. ...	29.235	.240	.237	.235	.238	.247	.261	.268	.278	.279	.277	.267	.256	.241	.228	.220	.213	.214	.218	.221	.227	.230	.232	.229	.241
Jacksonville, Fla. ...	30.131	.126	.117	.115	.122	.130	.149	.159	.168	.172	.165	.153	.130	.107	.091	.084	.081	.085	.101	.115	.129	.137	.139	.138	.127
Kansas City, Mo.	28.993	.991	.989	.986	.983	.987	.994	.000	.013	.019	.021	.018	.008	.992	.971	.959	.954	.955	.961	.970	.985	.994	.999	.997	.989
Key West, Fla.	30.145	.132	.119	.113	.115	.125	.139	.158	.169	.175	.178	.169	.153	.135	.121	.108	.104	.109	.121	.134	.146	.157	.158	.155	.139
Knoxville, Tenn. ...	29.095	.093	.090	.091	.098	.106	.118	.129	.139	.144	.143	.131	.122	.095	.076	.060	.051	.055	.065	.073	.083	.091	.093	.093	.097
Little Rock, Ark.	29.756	.759	.759	.759	.754	.761	.771	.784	.797	.805	.810	.805	.789	.765	.739	.725	.720	.723	.726	.728	.742	.750	.754	.753	.760
Louisville, Ky.	29.523	.522	.517	.515	.523	.532	.551	.566	.576	.579	.577	.565	.549	.530	.512	.503	.496	.496	.500	.505	.514	.519	.520	.521	.530
Lynchburg, Va.	29.406	.406	.405	.405	.412	.424	.437	.442	.442	.437	.425	.412	.397	.366	.350	.341	.341	.345	.359	.373	.385	.391	.392	.392	.395
Marquette, Mich.	29.111	.106	.098	.090	.092	.099	.103	.108	.109	.114	.117	.114	.104	.101	.095	.090	.097	.103	.112	.115	.118	.117	.118	.113	.106
Memphis, Tenn.	29.755	.756	.753	.751	.757	.765	.784	.798	.810	.814	.817	.805	.789	.765	.745	.729	.720	.719	.726	.733	.745	.751	.748	.752	.762
Milwaukee, Wis.	29.243	.246	.240	.247	.251	.258	.266	.267	.271	.268	.265	.251	.237	.225	.219	.215	.218	.226	.229	.230	.230	.236	.235	.243	.243
Moorhead, Minn.	28.905	.905	.907	.904	.903	.907	.913	.912	.911	.909	.915	.902	.890	.882	.875	.875	.879	.884	.894	.901	.901	.906	.911	.900	.900
Nantucket, Mass.	30.087	.084	.078	.075	.082	.089	.095	.094	.099	.094	.090	.081	.058	.054	.047	.045	.047	.050	.058	.062	.070	.072	.072	.074	.074
Nashville, Tenn.	29.520	.520	.516	.517	.522	.537	.553	.564	.573	.577	.571	.564	.539	.512	.495	.486	.480	.479	.483	.493	.500	.507	.513	.514	.522
New Haven, Conn. ...	29.973	.964	.960	.962	.968	.979	.987	.992	.993	.984	.972	.958	.936	.920	.911	.907	.915	.920	.932	.945	.954	.956	.956	.955	.954
New Orleans, La.	30.068	.065	.062	.054	.052	.063	.076	.090	.105	.115	.118	.112	.098	.079	.060	.046	.038	.040	.045	.052	.061	.071	.075	.072	.072
New York, N. Y.	29.924	.920	.912	.911	.915	.921	.930	.936	.937	.934	.924	.913	.894	.878	.866	.863	.863	.867	.878	.889	.896	.903	.907	.904	.904
Norfolk, Va.	30.079	.073	.065	.065	.074	.086	.099	.107	.112	.109	.100	.086	.062	.041	.030	.023	.027	.031	.046	.059	.070	.075	.077	.074	.070
Omaha, Neb.	28.798	.800	.805	.805	.805	.812	.814	.818	.818	.813	.811	.805	.794	.775	.758	.751	.746	.749	.758	.772	.782	.791	.798	.798	.789
Philadelphia, Pa. ...	30.001	.000	.994	.994	.001	.009	.020	.026	.027	.025	.015	.998	.975	.960	.948	.941	.942	.948	.960	.969	.977	.981	.985	.985	.987
Pikes Peak, Colo. ...	17.546	.541	.532	.520	.507	.502	.503	.510	.522	.533	.542	.555	.565	.567	.566	.567	.572	.573	.571	.571	.570	.567	.564	.561	.547
Pittsburg, Pa.	29.210	.207	.205	.202	.203	.208	.214	.220	.222	.221	.215	.207	.190	.171	.143	.157	.160	.170	.178	.190	.197	.198	.201	.201	.196
Portland, Oreg.	29.869	.871	.869	.866	.866	.866	.849	.848	.847	.846	.850	.853	.855	.851	.844	.835	.826	.826	.825	.824	.831	.839	.849	.861	.848
Rochester, N. Y.	29.505	.505	.498	.497	.499	.503	.510	.516	.522	.521	.520	.515	.505	.490	.474	.460	.473	.476	.479	.488	.497	.499	.496	.491	.498
Roseburg, Oreg.	29.480	.483	.484	.479	.480	.475	.468	.465	.466	.467	.470	.474	.477	.471	.466	.453	.444	.436	.434	.433	.439	.447	.458	.467	.463
St. Louis, Mo.	29.441	.439	.439	.434	.431	.435	.445	.455	.463	.466	.464	.462	.449	.427	.409	.396	.386	.387	.395	.405	.416	.425	.434	.436	.431
St. Paul, Minn.	29.004	.005	.008	.006	.010	.018	.027	.034	.034	.034	.033	.034	.025	.011	.997	.988	.981	.981	.986	.994	.998	.002	.008	.009	.001
Salt Lake City, Utah	25.633	.633	.634	.636	.627	.622	.626	.632	.638	.645	.652	.655	.654	.647	.634	.620	.612	.605	.602	.603	.611	.620	.627	.633	.629
San Diego, Cal.	29.983	.980	.980	.974	.963	.953	.958	.9																	

TABLE VII.—Average wind movement for each hour of seventy-fifth meridian time, March, 1894.

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midnight.	Mean.
Abilene, Tex.	10.6	11.7	12.7	11.9	11.8	12.1	11.7	11.0	10.1	12.0	14.9	14.9	15.5	14.8	14.8	14.6	14.5	13.8	13.3	11.9	10.6	10.7	10.7	10.8	12.6
Albany, N. Y.	7.5	7.6	7.7	7.3	7.5	7.5	7.8	8.3	9.3	10.1	10.4	10.9	11.9	11.5	11.6	11.4	10.4	10.0	9.2	7.7	7.8	8.2	8.5	8.1	9.1
Alpena, Mich.	10.0	10.1	10.2	10.4	11.0	11.3	11.2	11.4	12.7	13.0	14.6	15.3	15.0	15.6	15.4	14.6	14.1	13.3	12.2	11.2	10.8	10.5	10.4	10.3	12.3
Amarillo, Tex.	18.5	18.5	17.6	17.3	17.4	16.1	15.7	15.9	16.4	18.1	21.7	22.2	21.7	22.1	22.3	22.0	21.6	22.5	22.3	20.0	17.6	18.5	19.3	18.9	19.3
Atlanta, Ga.	9.8	10.4	9.8	9.5	9.3	9.2	8.9	8.7	8.6	9.4	11.1	11.9	11.7	11.7	11.3	11.3	11.7	11.7	9.4	9.6	10.0	10.0	10.6	10.5	10.2
Atlantic City, N. J.	10.5	10.2	10.1	10.4	10.3	9.2	9.1	9.4	10.6	11.6	12.6	13.1	13.0	13.9	14.2	13.8	14.5	12.9	12.5	11.7	11.7	11.2	10.8	10.4	11.6
Augusta, Ga.	4.4	4.2	3.8	3.6	3.8	4.0	3.7	4.0	5.3	6.2	6.8	7.8	9.8	10.1	10.0	9.6	9.4	7.9	6.7	5.5	4.6	4.3	4.2	4.5	6.0
Baker City, Ore.	6.1	6.5	6.8	6.7	6.9	6.4	6.9	7.3	6.4	6.4	6.5	6.6	6.3	6.4	6.8	6.9	7.8	7.7	8.0	8.2	6.4	5.8	6.1	5.6	6.7
Baltimore, Md.	6.4	6.1	5.7	5.3	5.0	5.1	4.9	6.4	7.8	9.3	10.1	10.7	11.1	11.2	11.4	11.0	10.8	9.4	7.6	6.5	7.0	6.7	6.9	7.0	7.9
Bismarck, N. Dak.	12.1	11.5	12.7	12.0	11.2	10.8	11.0	11.9	11.1	10.9	11.6	13.5	13.6	15.9	16.8	17.1	17.0	16.6	15.6	14.4	12.9	11.2	11.0	11.0	13.1
Block Island, R. I.	13.3	13.6	13.7	13.2	13.4	13.5	13.3	13.0	14.0	14.1	14.4	15.1	15.6	15.0	16.2	15.1	15.0	15.0	14.6	15.0	13.9	13.3	13.6	13.6	14.2
Boston, Mass.	11.1	10.9	10.7	10.2	9.8	10.1	10.2	11.0	11.6	12.0	12.5	13.4	14.2	14.5	14.5	14.8	14.5	12.6	12.4	11.7	12.3	11.5	11.1	11.5	12.0
Buffalo, N. Y.	11.8	11.1	11.6	12.3	12.7	12.5	12.8	12.8	13.8	14.6	15.0	14.6	14.9	14.7	14.3	13.7	13.2	13.1	12.1	11.2	11.0	11.4	11.8	11.0	13.0
Chicago, Ill.	10.5	10.8	10.5	10.4	9.8	10.0	9.8	10.1	10.4	10.6	11.9	12.0	12.9	13.3	13.8	13.5	13.2	12.6	11.5	10.3	10.1	9.9	9.8	9.9	11.1
Cape Henry, Va.	11.3	11.9	10.9	10.7	10.3	10.8	11.2	10.8	11.4	12.4	13.8	12.0	13.7	13.2	12.2	11.8	11.8	10.9	9.4	10.6	11.4	12.9	12.5	12.7	11.6
Charleston, S. C.	6.5	7.2	6.7	6.5	6.3	6.1	6.0	5.9	7.0	7.5	8.3	8.9	10.3	10.8	11.4	11.3	11.2	10.1	8.3	7.7	6.8	6.3	6.8	6.9	7.9
Charlotte, N. C.	7.4	6.7	6.6	6.7	6.3	6.3	6.2	6.5	7.6	8.3	9.3	10.0	10.1	10.7	11.1	10.6	10.0	9.2	7.4	7.1	7.5	8.0	8.1	8.1	8.1
Chattanooga, Tenn.	6.2	6.7	6.6	6.3	6.6	6.1	5.6	5.6	6.5	6.8	8.2	8.9	9.3	10.2	10.5	11.1	11.1	9.3	8.6	8.2	7.0	6.7	6.4	7.9	7.9
Cheyenne, Wyo.	11.0	11.1	11.9	12.3	11.3	11.6	12.4	12.8	14.0	14.2	15.9	18.4	20.1	20.0	21.3	20.9	20.8	20.9	21.0	17.5	13.6	12.6	11.0	11.7	15.3
Chicago, Ill.	21.2	21.0	21.5	21.6	21.0	20.3	19.7	20.3	21.2	21.0	22.6	22.6	24.0	23.6	24.4	24.7	25.7	24.5	22.2	21.7	22.1	21.9	22.9	22.0	22.2
Cincinnati, Ohio.	6.1	6.0	6.3	6.5	6.9	6.5	6.1	7.1	8.3	8.8	9.5	9.7	10.9	11.1	11.7	10.5	11.2	10.5	9.0	7.7	7.4	7.0	7.0	6.4	8.3
Cleveland, Ohio.	13.3	13.1	12.6	12.4	12.1	12.3	12.1	12.4	13.2	14.0	14.0	14.0	14.1	14.9	16.0	17.6	17.6	17.0	17.4	16.9	16.4	15.6	14.8	13.6	15.0
Colorado Spr'gs, Colo.	9.6	9.6	10.5	10.4	10.5	9.7	9.3	8.5	9.7	10.1	10.1	12.1	14.8	15.0	17.3	16.9	16.6	17.6	17.2	14.5	11.7	10.8	10.4	9.8	12.5
Columbia, Mo.	9.3	8.9	8.2	7.9	8.1	7.6	7.3	8.3	9.8	11.3	12.6	13.2	12.8	13.1	13.2	13.1	12.7	11.4	9.9	8.5	8.4	8.6	9.3	9.6	10.1
Columbus, Ohio.	9.4	10.0	9.8	10.2	10.1	10.0	10.2	10.5	11.2	12.5	12.7	13.2	14.2	15.3	15.2	15.5	14.8	13.4	10.9	10.8	10.7	10.2	10.8	10.3	11.7
Concordia, Kans.	9.4	10.0	8.9	9.2	10.0	10.0	9.8	9.8	10.3	12.2	13.1	14.0	14.3	14.6	14.9	14.4	14.0	13.3	11.6	10.1	8.7	8.5	9.1	8.9	11.2
Corpus Christi, Tex.	12.6	12.6	12.6	12.4	12.1	12.3	12.1	12.4	13.2	14.0	14.0	14.0	14.1	14.9	16.0	17.6	17.6	17.0	17.4	16.9	16.4	15.6	14.8	13.6	14.5
Davenport, Iowa.	11.1	10.5	10.2	10.1	9.2	9.0	9.8	10.1	10.5	12.3	13.2	14.8	14.9	15.5	16.2	16.2	15.6	15.4	14.1	12.3	13.2	12.5	11.6	11.8	14.5
Denver, Colo.	8.3	7.2	6.7	7.8	7.5	7.2	7.6	7.9	7.7	7.5	7.3	7.8	8.8	10.0	11.0	10.2	11.1	11.4	11.2	10.4	9.9	9.1	8.0	7.2	8.7
Des Moines, Iowa.	9.4	8.4	8.2	7.5	8.1	8.0	8.2	7.8	9.6	11.3	13.3	13.5	14.4	14.4	15.1	15.6	16.1	15.5	13.3	10.8	9.2	9.0	9.2	9.1	11.0
Detroit, Mich.	12.1	12.1	12.8	12.5	12.4	12.7	12.0	12.8	13.7	14.3	14.8	15.7	15.9	17.1	16.9	16.4	15.6	14.2	12.3	12.4	12.3	12.6	12.9	12.2	13.7
Dodge City, Kans.	11.7	11.8	11.9	11.3	11.0	10.8	10.5	10.7	11.3	14.0	15.8	16.5	17.8	18.4	18.4	18.5	17.6	17.0	17.7	15.5	12.0	12.4	11.6	11.7	14.3
Dubuque, Iowa.	6.3	6.1	6.1	5.7	6.0	5.4	5.2	5.4	6.4	7.3	8.3	8.7	9.4	10.3	9.9	9.9	10.2	10.0	8.1	6.9	6.4	6.1	6.6	6.6	7.4
Duluth, Minn.	6.7	7.0	6.6	6.8	6.5	6.2	6.4	7.3	8.0	7.5	7.7	8.0	9.0	9.5	9.3	9.2	9.1	8.1	7.4	6.8	7.0	7.5	7.4	6.8	7.6
Eastport, Me.	8.9	8.8	8.8	9.2	9.2	9.8	9.9	11.1	12.2	12.6	13.4	14.0	13.7	13.4	13.3	12.4	11.5	11.0	10.4	10.9	10.4	10.3	9.4	9.3	11.0
El Paso, Tex.	11.8	11.4	11.1	10.7	10.5	10.7	10.0	9.9	10.2	9.9	10.5	11.4	13.1	14.5	14.8	15.4	15.6	17.1	17.1	15.1	12.1	11.6	11.7	11.9	12.4
Erie, Pa.	12.0	12.5	12.6	12.4	12.0	12.0	12.7	13.8	13.7	14.4	14.5	14.7	15.0	14.7	15.0	13.3	13.2	13.9	11.5	10.9	10.3	10.2	10.4	11.7	12.6
Eureka, Cal.	6.4	6.3	5.7	6.2	6.2	6.5	5.9	5.8	6.2	5.0	5.2	5.5	6.2	7.7	9.2	10.0	10.7	10.8	9.9	9.7	8.9	7.8	8.3	6.9	7.4
Fort Canby, Wash.	17.0	16.2	15.4	15.7	16.0	18.4	17.6	17.1	17.8	16.9	15.8	16.0	16.5	16.6	16.9	17.8	16.6	17.0	16.3	15.7	15.2	15.4	16.6	16.5	16.5
Fort Smith, Ark.	7.7	8.7	8.6	7.7	8.0	7.7	7.1	7.7	8.0	8.1	9.1	9.1	9.0	9.3	9.1	9.7	9.8	10.1	8.5	7.9	7.8	7.7	7.5	7.6	8.4
Fresno, Cal.	7.1	7.1	7.0	6.8	6.7	6.6	6.6	6.3	5.6	5.5	5.2	6.1	6.8	7.5	7.2	7.0	7.7	8.9	8.8	9.2	8.5	7.6	7.8	7.6	7.1
Galveston, Tex.	13.5	13.1	12.7	12.4	13.1	12.8	12.5	12.5	12.3	12.3	12.9	12.9	13.0	13.3	13.2	13.3	13.5	13.1	13.0	12.6	13.2	14.5	14.3	13.0	13.0
Grand Haven, Mich.	13.1	13.0	13.4	13.7	13.7	13.3	12.8	13.3	13.6	14.8	15.6	15.7	15.8	15.4	15.2	14.4	13.9	13.0	12.4	11.5	12.3	9.1	13.8	13.8	13.8
Green Bay, Wis.	9.9	10.3	10.3	10.3	10.5	10.3	10.5	10.3	11.3	11.2	11.5	11.6	11.5	12.9	12.8	12.4	12.8	12.5	11.3	10.1	9.5	9.5	9.7	9.6	10.9
Hannibal, Mo.	11.3	11.3	10.4	10.1	9.5	10.1	10.1	10.9	13.0	13.4	14.7	15.8	16.8	16.5	16.6	16.1	15.9	14.1	12.4	10.3	11.3	12.1	11.8	11.3	12.7
Harrisburg, Pa.	6.0	6.6	6.1	6.3	6.2	5.6	5.6	6.1	6.5	7.2	7.7	8.2	9.1	9.9	9.7	10.0	9.6	8.6	7.7	7.9	7.9	7.5	7.1	6.6	7.5
Battersea, N. C.	13.7	13.7	13.8	14.2	14.3	13.8	13.7	13.7	13.8	13.8	13.8	13.9	14.1	14.0	13.7	13.7	13.9	13.5	12.7	12.7	13.2	13.8	13.7	13.6	13.6
Hayre, Mont.	9.0	9.2	8.6	7.6	8.2	8.7	8.6	8.5	9.7	9.8	11.2	12.9	13.5	14.1	13.9	14.1	13.3	12.5	11.1	9.5	8.8	8.8	9.1	8.7	10.4
Helena, Mont.	8.5	8.4	9.7	9.1	8.3	8.4	8.2	8.9	9.5	8.8	7.9	8.6	9.5	10.1	10.8	10.8	11.0	10.7	11.1	9.9	9.2	8.7	8.7	8.3	9.3
Huron, S. Dak.	13.4	13.6	13.9	14.5	15.4	15.6	14.7	14.5	15.9	17.6	18.8	18.0	17.8	17.3	17.2	17.5	18.1	17.5	15.6	14.3	14.1	13.8	14.5	14.1	15.7
Idaho Falls, Idaho.	13.2	11.5	11.5	11.5	11.3	11.2	10.0	9.8	11.1	10.4	10.9	11.2	11.5	11.9	12.5	13.1	13.5	13.5	13.4	13.2	12.9	11.5	12.3	13.0	11.9
Indianapolis, Ind.	7.5	7.5	7.0	7.2	7.0	6.5	6.9	7.9	8.6	9.6	9.1	9.9	9.7	10.0	10.7	10.4	9.7	8.1	7.1	7.1	7.1	7.1			

TABLE VII.—Average wind movement, etc.—Continued.

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midnight.	Mean.
Oklahoma, Okla.	10.5	10.1	10.2	10.6	10.1	9.9	10.1	10.2	10.9	12.3	13.6	13.8	14.0	14.0	14.4	15.2	15.7	14.8	13.5	11.1	10.6	10.1	11.2	10.8	12.0
Olympia, Wash.	4.7	5.0	5.2	5.4	5.1	5.4	5.1	5.4	5.5	5.7	5.9	5.9	6.9	6.9	8.1	8.2	8.6	8.9	8.9	7.7	6.8	5.4	5.2	4.7	6.3
Omaha, Nebr.	8.4	8.4	8.0	7.9	8.4	9.1	9.0	9.1	10.1	10.9	12.3	13.3	13.9	13.7	14.1	14.3	13.4	12.5	10.6	9.0	8.2	7.5	7.5	7.9	10.3
Oswego, N. Y.	12.4	12.4	12.6	12.8	13.2	12.4	11.9	13.5	13.7	14.0	14.9	14.8	14.3	14.6	14.1	13.8	13.5	12.5	12.0	12.9	12.7	12.8	12.8	13.5	13.3
Palestine, Tex.	7.6	7.0	7.0	7.3	6.8	6.9	7.2	7.4	8.2	8.8	9.0	9.0	9.3	9.3	9.2	9.2	8.9	8.5	7.8	7.0	7.9	7.9	8.4	9.2	8.2
Parkersburg, W. Va. .	4.5	4.7	4.7	4.9	4.6	4.5	4.4	5.0	6.0	7.7	8.8	9.2	9.5	9.2	9.4	8.9	8.5	6.8	5.1	5.7	5.1	4.7	4.3	4.8	6.3
Pensacola, Fla.	10.5	10.1	9.8	9.1	9.2	10.1	10.1	10.9	10.7	11.3	11.7	11.9	12.1	12.3	11.5	11.5	11.5	11.3	10.1	9.6	9.1	9.5	10.0	10.3	10.6
Philadelphia, Pa.	9.7	9.1	8.5	8.3	8.4	8.5	8.7	8.6	9.3	10.7	11.3	11.7	12.0	12.2	12.9	13.2	12.9	11.2	10.7	10.2	9.7	9.3	9.4	9.4	10.2
Pierre, S. Dak.	37.7	37.7	38.2	40.0	40.5	40.1	38.1	38.3	40.9	39.6	37.1	34.4	31.5	27.8	26.7	26.2	25.9	26.5	29.4	30.5	32.1	35.0	37.5	38.5	34.6
Pikes Peak, Colo.	37.7	37.7	38.2	40.0	40.5	40.1	38.1	38.3	40.9	39.6	37.1	34.4	31.5	27.8	26.7	26.2	25.9	26.5	29.4	30.5	32.1	35.0	37.5	38.5	34.6
Pittsburg, Pa.	6.6	6.1	6.1	6.2	5.9	6.0	5.9	6.1	6.4	7.9	8.8	9.1	9.7	9.5	9.9	9.6	9.9	9.1	7.8	6.2	6.7	6.8	7.2	7.3	7.5
Port Angeles, Wash. .	5.4	4.8	4.4	4.4	4.5	4.3	4.2	4.7	4.2	4.7	3.9	3.2	3.6	4.4	5.3	5.5	5.6	6.1	6.2	6.2	5.7	4.9	5.9	5.2	4.9
Port Huron, Mich. .	12.3	13.1	13.2	12.6	12.4	12.7	13.0	13.4	14.3	15.2	15.8	16.1	16.5	16.4	17.3	16.5	16.4	16.6	14.6	13.2	12.2	12.1	12.6	12.6	14.0
Portland, Me.	6.5	6.1	6.0	6.5	6.6	6.8	6.6	7.1	8.5	8.7	9.0	9.0	9.6	10.2	10.0	9.5	9.0	8.2	7.4	6.9	7.0	6.2	6.0	6.5	7.7
Portland, Oreg.	9.7	8.9	8.8	9.2	10.5	9.3	9.0	9.2	8.7	9.3	9.3	9.4	9.6	10.9	11.2	11.1	10.9	11.3	11.2	10.7	10.3	9.3	8.9	9.0	9.8
Pueblo, Colo.	8.2	8.6	9.0	8.3	7.5	6.9	7.7	7.7	7.1	8.4	9.6	10.5	11.0	11.3	13.1	14.4	14.3	14.0	12.8	11.4	10.7	10.1	10.1	8.5	10.0
Raleigh, N. C.	5.6	5.8	5.8	5.6	5.5	5.5	5.0	5.9	7.0	7.8	8.5	8.4	8.9	8.5	8.8	9.4	9.0	6.9	4.8	5.1	5.5	5.9	6.0	6.2	6.7
Rapid City, S. Dak. .	10.6	10.0	9.7	10.3	11.2	10.5	10.1	10.3	10.6	11.3	11.4	12.9	13.2	14.3	15.4	17.5	16.6	16.4	14.6	14.0	12.0	11.8	12.1	12.1	12.5
Red Bluff, Cal.	6.3	5.8	6.3	6.4	6.4	6.3	6.4	6.2	6.3	6.5	6.5	7.4	8.3	8.7	8.8	9.0	9.4	9.5	9.4	9.1	8.0	6.9	6.5	6.0	7.3
Rochester, N. Y.	7.6	7.6	7.4	7.8	8.0	7.9	8.3	8.3	10.9	11.6	12.1	12.4	12.7	12.5	12.2	11.3	10.2	10.0	8.9	8.8	9.2	7.9	7.6	7.8	9.6
Roseburg, Oreg.	3.0	3.4	3.5	3.5	3.3	2.9	2.8	2.8	3.2	3.4	3.4	3.5	4.2	4.9	5.6	5.9	6.9	7.2	7.6	7.5	6.1	4.7	3.4	3.0	4.4
Sacramento, Cal.	6.2	6.1	6.2	6.5	6.6	6.4	7.0	7.3	7.1	6.8	7.0	8.3	8.9	9.1	10.3	10.5	10.4	10.2	9.9	9.3	8.1	7.2	6.3	6.3	7.8
St. Louis, Mo.	12.6	12.1	11.8	12.2	12.0	11.8	11.8	12.0	13.5	14.4	15.0	14.6	14.8	15.8	16.0	16.6	17.2	16.1	14.2	13.0	12.7	12.4	12.6	12.6	13.7
St. Paul, Minn.	9.7	8.7	7.6	8.3	7.8	7.9	8.5	8.7	8.9	9.0	10.5	11.9	12.3	11.9	11.7	12.5	12.6	12.6	11.9	10.9	9.5	9.6	9.6	9.9	10.1
St. Vincent, Minn.	9.5	9.4	9.7	9.3	9.3	9.4	9.5	10.3	10.4	11.3	12.6	13.2	13.4	13.7	13.8	13.4	13.5	13.5	11.9	11.0	10.4	10.5	10.7	10.5	11.3
Salt Lake City, Utah .	6.2	6.6	6.7	7.0	6.4	6.0	5.5	4.6	4.2	4.5	5.1	5.8	8.2	9.7	10.3	10.5	9.8	10.9	9.3	8.6	7.6	5.8	5.4	6.3	7.1
San Antonio, Tex.	9.1	8.3	8.0	8.2	7.3	7.2	7.4	6.8	7.0	8.1	10.1	10.1	10.7	10.3	10.1	10.3	10.7	11.4	11.7	11.6	11.1	11.1	11.5	10.2	9.5
San Diego, Cal.	4.9	4.7	4.6	4.5	4.4	4.3	4.5	4.6	4.5	4.4	4.1	4.2	5.4	6.6	8.1	8.9	9.5	9.9	9.4	8.0	6.5	5.1	4.4	4.4	5.8
Sandusky, Ohio.	9.3	9.1	9.4	10.2	10.0	9.6	10.5	10.2	10.6	11.4	11.5	11.9	12.9	12.5	12.6	12.4	12.1	10.5	9.9	9.3	9.5	9.9	9.9	9.5	10.6
San Francisco, Cal.	9.8	9.5	8.5	8.2	7.6	7.6	7.5	7.7	6.9	6.6	7.4	8.5	9.1	9.5	10.7	13.7	15.5	17.0	17.5	17.8	16.3	15.6	14.4	12.1	11.0
Santa Fe, N. Mex.	5.9	5.5	5.4	4.5	4.3	3.9	4.5	5.1	5.5	6.1	8.0	9.9	11.2	11.9	12.2	13.0	12.8	12.1	12.0	11.1	7.7	6.7	6.7	6.6	8.0
Sault Ste. Marie, Mich.	7.5	7.5	7.5	7.9	8.4	8.4	9.0	10.0	11.1	11.4	12.3	12.2	13.5	13.6	13.2	12.9	12.8	11.2	9.6	9.1	8.4	8.3	8.5	7.8	10.1
Savannah, Ga.	8.1	8.1	7.1	6.6	6.8	6.7	6.7	7.1	7.4	8.3	8.9	9.5	9.5	10.2	11.2	10.7	11.2	10.9	9.9	8.8	8.8	8.5	9.3	9.0	8.7
Seattle, Wash.	6.2	6.3	7.2	7.8	7.8	7.5	7.5	7.2	7.2	7.7	7.5	7.9	8.2	8.2	8.8	8.8	8.9	9.4	10.4	9.7	9.0	7.9	7.2	6.9	8.0
Shreveport, La.	9.6	8.7	7.8	8.2	8.3	8.4	8.5	8.9	8.7	9.5	9.6	9.3	8.8	10.0	10.1	10.5	9.9	9.3	8.8	7.8	7.4	8.4	10.0	10.3	9.1
Sioux City, Iowa.	11.2	11.3	11.1	11.2	11.8	12.2	11.7	12.5	13.1	15.0	16.7	18.0	19.3	19.8	19.6	20.2	19.4	18.0	15.0	12.3	11.0	10.5	10.8	11.4	14.3
Southport, N. C.	7.3	8.0	8.0	7.7	8.1	8.0	8.5	9.2	9.3	10.1	10.9	11.0	12.0	12.3	12.3	12.4	12.3	10.7	9.3	9.6	8.7	8.3	7.4	7.5	9.5
Spokane, Wash.	7.2	7.4	7.7	7.5	7.5	7.4	6.7	6.5	6.4	5.9	6.1	6.5	7.7	8.2	9.3	9.8	8.9	8.1	7.7	7.8	7.3	7.3	7.5	7.6	7.6
Springfield, Ill.	10.6	10.2	10.5	10.4	10.5	10.6	10.3	10.4	11.7	12.8	13.4	14.7	15.3	15.5	15.6	15.5	15.5	14.1	12.4	11.1	10.9	11.4	10.9	11.0	12.3
Springfield, Mo.	10.4	11.0	11.0	10.6	10.7	10.5	10.3	11.3	11.3	12.3	14.4	14.8	15.8	14.8	14.5	14.3	15.0	14.3	11.9	11.5	10.8	11.2	11.1	11.7	12.2
Tampa, Fla.	5.0	4.9	4.4	4.4	4.9	4.9	5.4	5.2	6.5	8.3	8.5	8.3	8.6	8.5	8.7	9.6	9.9	9.6	7.6	5.9	4.9	4.5	5.0	4.7	6.6
Tatoosh Island, Wash.	16.4	17.0	16.3	17.8	16.9	15.4	15.1	15.7	16.1	16.4	17.2	18.6	18.0	18.7	17.5	18.1	17.4	17.0	16.4	16.1	15.2	15.9	16.4	16.3	16.7
Titusville, Fla.	11.8	10.1	9.3	9.2	9.3	8.8	9.2	9.0	10.6	12.6	14.5	14.5	15.6	16.4	16.7	18.3	18.7	19.4	19.1	17.4	16.0	13.3	12.7	11.8	13.5
Toledo, Ohio.	11.0	10.7	10.8	11.2	11.3	11.5	11.2	11.0	11.9	12.7	14.4	14.1	15.4	14.9	15.1	14.9	15.6	14.3	13.1	11.7	11.4	10.9	11.7	10.8	12.6
Tucson, Ariz.	7.8	7.1	6.8	6.9	6.9	7.5	6.9	6.9	7.9	7.4	8.4	9.3	8.4	7.4	7.9	8.6	10.2	11.2	10.8	11.1	9.7	8.1	7.9	7.9	8.3
Valentine, Nebr.	12.2	12.5	12.5	11.9	12.6	11.7	11.8	11.8	12.0	12.7	15.0	16.1	16.4	16.2	16.4	16.3	16.2	16.8	16.6	14.7	12.8	11.5	11.5	12.1	13.8
Vicksburg, Miss.	9.3	9.5	9.0	9.1	8.1	7.8	7.3	8.1	7.8	8.4	8.9	9.3	9.9	9.9	9.6	10.2	9.9	9.5	9.2	8.7	9.4	10.6	10.1	10.1	9.2
Vineyard Haven, Mass.	8.8	8.5	9.0	9.0	8.9	8.5	8.5	8.7	9.0	9.6	10.4	11.0	11.4	11.8	11.4	11.2	10.6	10.0	8.6	8.7	8.4	8.3	8.7	8.6	9.5
Walla Walla, Wash. .	6.7	7.2	7.1	6.9	7.0	6.5	6.5	6.4	6.9	6.5	7.3	7.7	8.0	10.3	10.6	10.3	10.5	9.6	9.2	8.9	8.2	6.8	6.9	6.6	7.9
Washington, D. C.	5.9	4.9	4.4	5.0	4.6	4.7	4.6	5.3	6.8	8.1	9.2	10.5	10.0	11.3	11.9	11.4	10.8	9.1	7.5	6.7	6.3	6.4	6.2	6.0	7.4
Wichita, Kans.	8.9	8.9	9.6	11.0	10.8	10.5	10.2	11.3	11.5	13.5	14.2	14.7	15.3	16.6	16.9	16.3	15.9	15.3	13.4	11.8	10.5	9.8	9.6	9.5	12.3
Williston, N. Dak.	11.3	10.8	10.2	9.4	8.6	7.7	8.0	8.7	8.3	7.9	9.3	10.4	12.9	14.5	15.1	16.1	16.2	14.8	14.3	13.3	12.9	12.6	12.1	11.4	11.5
Wilmington, N. C.	7.7	7.5	7.6	7.4	6.8	7																			

MONTHLY WEATHER REVIEW.

146

TABLE VIII.—Prevailing and resultant winds from self-registers for March, 1894.

Number.	Station.	Prevailing wind.		Total movement.		Resultant direction.			Resultant movement.		Azimuth of movement minus direction.	Ratio of resultant movement to total movement.
		Direction from.	Duration.	Monthly.	Hourly average.	Direction from.	Duration.	Average hourly velocity.	Direction from.	Amount.		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
			Hours.	Miles.	Miles.		Hours.	Miles.		Miles.		
1	Eastport, Me.	sw.	162	8,173	11.0	s. 88 w.	220	11.1	n. 83 w.	2,452	+ 9	0.300
2	Portland, Me.	sw.	204	5,699	7.7	s. 60 w.	238	8.2	s. 54 w.	1,958	+ 6	0.344
3	Boston, Mass.	w.	179	8,964	12.0	s. 66 w.	286	15.2	s. 75 w.	4,346	+ 9	0.485
4	Nantucket, Mass.	n.	162	8,778	11.8	n. 55 w.	230	12.4	n. 72 w.	2,843	+ 7	0.324
5	New Haven, Conn.	n.	140	6,209	8.3	n. 85 w.	101	15.6	n. 72 w.	1,577	+13	0.254
6	Albany, N. Y.	s.	237	6,764	9.1	s. 56 w.	198	9.7	s. 46 w.	1,918	-10	0.284
7	New York, N. Y.	nw.	193	7,745	10.4	n. 70 w.	134	18.9	n. 79 w.	2,524	- 9	0.326
8	Philadelphia, Pa.	nw.	167	7,620	10.2	n. 63 w.	145	16.0	n. 62 w.	2,315	+ 1	0.304
9	Baltimore, Md.	nw.	157	5,872	7.9	s. 89 w.	85	23.9	n. 76 w.	2,028	+15	0.345
10	Washington, D. C.	nw.	185	5,504	7.4	s. 84 w.	92	17.9	n. 77 w.	1,650	+19	0.300
11	Lynchburg, Va.	nw.	198	3,657	4.9	s. 85 w.	174	8.0	n. 80 w.	1,399	+15	0.382
12	Norfolk, Va.	n.	157	6,028	8.1	n. 65 e.	132	1.1	s. 68 e.	148	+ 5	0.024
13	Wilmington, N. C.	nw.	204	6,586	8.9	s. 52 w.	129	14.7	s. 57 w.	1,877	+ 5	0.285
14	Augusta, Ga.	nw.	155	4,474	6.0	s. 58 w.	149	9.1	s. 62 w.	1,361	+ 8	0.304
15	Savannah, Ga.	s.	271	6,488	8.7	s. 20 w.	221	8.8	s. 28 w.	1,950	+ 8	0.301
16	Jacksonville, Fla.	s.	206	5,512	7.4	s. 21 e.	170	9.2	s. 12 e.	1,587	+ 9	0.282
17	Key West, Fla.	nw.	280	7,857	10.6	n. 88 e.	433	10.9	n. 81 e.	4,707	+ 7	0.599
18	Atlanta, Ga.	se.	191	7,574	10.2	s. 54 w.	238	11.2	s. 60 w.	2,675	+ 6	0.353
19	Vicksburg, Miss.	se.	210	6,809	9.2	s. 35 e.	244	11.0	s. 29 e.	2,692	+ 6	0.395
20	New Orleans, La.	se.	273	7,778	10.5	s. 57 e.	332	10.7	s. 60 e.	3,560	- 3	0.458
21	Little Rock, Ark.	s.	189	6,644	8.9	s. 0 w.	167	6.5	s. 2 w.	1,090	+ 2	0.164
22	Galveston, Tex.	se.	307	9,690	13.0	s. 46 e.	386	10.9	s. 56 e.	4,223	-10	0.436
23	Knoxville, Tenn.	sw.	271	3,977	5.3	s. 78 w.	285	7.5	s. 67 w.	2,130	-11	0.536
24	Memphis, Tenn.	se.	208	6,742	9.1	s. 17 e.	240	9.4	s. 22 e.	2,268	- 5	0.336
25	Nashville, Tenn.	se.	222	5,440	7.3	s. 20 e.	177	8.0	s. 8 w.	1,415	+28	0.260
26	Louisville, Ky.	s.	188	7,205	9.7	s. 8 w.	252	11.3	s. 23 w.	2,858	+14	0.397
27	Indianapolis, Ind.	se.	191	6,064	8.2	s. 26 w.	245	8.6	s. 24 w.	2,112	- 2	0.348
28	Cincinnati, Ohio.	se.	188	6,144	8.3	s. 20 w.	235	7.4	s. 34 w.	1,731	+14	0.282
29	Columbus, Ohio.	nw.	176	8,739	11.7	s. 36 w.	262	14.5	s. 70 w.	3,803	+14	0.435
30	Pittsburg, Pa.	nw.	200	5,607	7.5	s. 71 w.	247	9.8	s. 77 w.	2,427	+ 6	0.433
31	Buffalo, N. Y.	sw.	199	9,685	13.0	s. 82 w.	285	19.4	s. 86 w.	5,515	+ 4	0.569
32	Rochester, N. Y.	sw.	318	7,123	9.6	s. 48 w.	321	12.9	s. 57 w.	4,153	+ 9	0.583
33	Cleveland, Ohio.	sw.	245	11,144	15.0	s. 5 w.	222	18.8	s. 17 w.	4,180	+12	0.374
34	Toledo, Ohio.	sw.	173	9,351	12.6	s. 65 w.	274	14.6	s. 68 w.	3,988	+ 3	0.426
35	Detroit, Mich.	sw.	267	10,192	13.7	s. 62 w.	327	17.4	s. 65 w.	5,674	+ 3	0.556
36	Alpena, Mich.	se.	168	9,130	12.3	s. 47 w.	161	12.6	s. 60 w.	2,034	+13	0.223
37	Grand Haven, Mich.	sw.	160	10,236	13.8	s. 44 w.	189	19.4	s. 36 w.	3,664	- 8	0.358
38	Marquette, Mich.	nw.	172	8,973	12.1	n. 76 w.	124	18.9	s. 80 w.	2,341	+24	0.261
39	Sault Ste. Marie, Mich.	se.	301	7,500	10.1	s. 28 e.	90	3.3	s. 38 w.	293	+66	0.039
40	Chicago, Ill.	sw.	198	16,485	22.2	s. 54 w.	255	26.6	s. 46 w.	6,772	- 8	0.411
41	Milwaukee, Wis.	sw.	154	9,406	12.6	s. 47 w.	195	15.2	s. 56 w.	2,968	+ 9	0.316
42	Duluth, Minn.	nw.	175	5,634	7.6	n. 11 e.	191	10.4	n. 4 e.	1,682	- 7	0.352
43	Moorhead, Minn.	nw.	198	9,608	12.9	n. 64 w.	166	10.5	n. 42 w.	1,741	+25	0.181
44	Bismarck, N. Dak.	nw.	311	9,716	13.1	n. 39 w.	256	11.0	n. 4 w.	2,964	+35	0.305
45	Saint Paul, Minn.	se.	246	7,526	10.1	s. 13 w.	143	9.3	s. 53 w.	1,324	+40	0.176
46	Davenport, Iowa.	sw.	203	9,320	12.5	s. 42 w.	254	13.3	s. 51 w.	3,788	+ 9	0.466
47	Des Moines, Iowa.	sw.	196	8,209	11.0	s. 74 w.	233	13.8	s. 67 w.	3,207	- 7	0.391
48	Saint Louis, Mo.	sw.	190	10,158	13.7	s. 23 w.	254	15.4	s. 22 w.	3,916	0	0.385
49	Kansas City, Mo.	sw.	183	9,125	12.3	s. 65 w.	132	18.9	s. 68 w.	2,505	+ 3	0.274
50	Omaha, Nebr.	nw.	221	7,666	10.3	s. 69 w.	135	11.8	s. 47 w.	1,599	-22	0.209
51	Huron, S. Dak.	nw.	247	11,716	15.7	n. 50 w.	149	15.8	n. 51 w.	2,353	+ 8	0.201
52	Havre, Mont.	sw.	254	7,737	10.4	n. 86 w.	292	14.3	s. 81 w.	4,108	-13	0.539
53	Helena, Mont.	n.	393	6,888	9.3	s. 60 w.	453	10.1	s. 58 w.	4,574	- 2	0.664
54	Colorado Springs, Colo.	n.	255	9,063	12.2	n. 10 e.	142	15.4	n. 21 w.	2,183	-31	0.241
55	Denver, Colo.	sw.	154	6,491	8.7	s. 54 w.	129	6.8	n. 83 w.	880	+43	0.136
56	Pikes Peak, Colo.	w.	274	25,733	34.6	n. 84 w.	426	42.5	n. 87 w.	18,102	- 3	0.704
57	Dodge City, Kans.	se.	180	10,641	14.3	s. 86 e.	102	16.9	s. 27 e.	1,725	+53	0.162
58	Abilene, Tex.	nw.	161	9,348	12.0	s. 3 e.	147	17.9	s. 7 e.	2,631	- 4	0.281
59	El Paso, Tex.	nw.	317	9,243	12.4	n. 60 w.	354	15.8	n. 62 w.	5,605	- 2	0.606
60	Santa Fe, N. Mex.	sw.	199	5,961	8.0	s. 74 w.	82	19.0	s. 84 w.	1,561	+10	0.269
61	Yuma, Ariz.	w.	144	5,738	7.7	n. 81 w.	154	10.9	n. 83 w.	1,676	- 2	0.292
62	Keeler, Cal.	e.	142	6,397	8.6	n. 15 w.	30	76.8	n. 52 w.	1,537	-37	0.241
63	Salt Lake City, Utah.	sw.	173	5,273	7.1	s. 30 w.	80	14.0	s. 38 w.	1,118	+ 8	0.212
64	Spokane, Wash.	sw.	240	5,683	7.6	s. 1 w.	377	9.8	s. 11 w.	3,683	+10	0.648
65	Seattle, Wash.	s.	200	5,922	8.0	s. 42 e.	255	11.3	s. 33 e.	3,376	+ 9	0.570
66	Portland, Oregon.	sw.	134	7,305	9.8	s. 46 w.	137	15.7	s. 41 w.	4,008	- 5	0.549
67	Roseburg, Oregon.	sw.	425	3,270	4.4	s. 29 w.	386	9.2	s. 31 w.	1,258	+ 2	0.385
68	San Francisco, Cal.	sw.	180	8,215	11.0	s. 53 w.	237	15.7	s. 53 w.	6,059	0	0.738
69	San Diego, Cal.	w.		4,335	5.8	n. 79 w.		8.6	n. 84 w.	2,042	- 5	0.471

TABLE IX.—Resultant winds from observations at 8 a. m. and 8 p. m., daily, during March, 1894.

Number.	Station.	Component direction from—				Resultant.		Number.	Station.	Component direction from—				Resultant.	
		N.	S.	E.	W.	Direction from—	Duration.			N.	S.	E.	W.	Direction from—	Duration.
New England.															
1	Eastport, Me.	21	19	8	25	n. 83 w.	17	73	Green Bay, Wis.	18	24	9	22	s. 65 w.	14
2	Portland, Me.	17	27	6	23	s. 60 w.	20	74	Duluth, Minn.	23	8	23	21	n. 8 e.	15
3	Northfield, Vt.	23	32	4	9	s. 29 w.	10	North Dakota.							
4	Boston, Mass.	12	19	11	34	s. 73 w.	24	75	Moorhead, Minn.	26	16	10	23	n. 52 w.	16
5	Nantucket, Mass.	26	15	11	24	n. 50 w.	17	76	Saint Vincent, Minn.	27	12	11	17	n. 22 w.	16
6	Woods Holl, Mass.	9	14	5	15	s. 63 w.	11	77	Bismarck, N. Dak.	28	13	13	25	n. 39 w.	19
7	Block Island, R. I.	19	22	11	31	s. 81 w.	20	78	Williston, N. Dak.						
8	New Haven, Conn.	23	18	16	19	n. 31 w.	6	Upper Mississippi Valley.							
9	New London, Conn.	17	21	12	26	s. 74 w.	15	79	Saint Paul, Minn.	12	24	21	24	s. 14 w.	12
Middle Atlantic States.								80	La Crosse, Wis.	17	26	11	15	s. 24 w.	10
10	Albany, N. Y.	16	28	7	23	s. 53 w.	20	81	Davenport, Iowa.	10	24	16	26	s. 36 w.	17
11	New York, N. Y.	23	21	14	24	n. 79 w.	10	82	Des Moines, Iowa	20	20	10	26	... w.	16
12	Harrisburg, Pa.	18	13	19	23	n. 39 w.	6	83	Iubaque, Iowa	10	23	17	24	s. 28 w.	15
13	Philadelphia, Pa.	19	20	16	23	s. 82 w.	7	84	Keokuk, Iowa	10	29	11	26	s. 38 w.	24
14	Atlantic City, N. J.	17	17	16	23	... w.	7	85	Cairo, Ill.	17	34	15	12	s. 10 e.	17
15	Baltimore, Md.	17	21	14	23	s. 66 w.	9	86	Springfield, Ill.	16	30	7	22	s. 47 w.	20
16	Washington, D. C.	25	20	16	19	n. 31 w.	6	87	Hannibal, Mo.	14	22	14	25	s. 54 w.	14
17	Lynchburg, Va.	21	22	11	24	s. 86 w.	13	88	Saint Louis, Mo.	10	27	19	22	s. 10 w.	17
18	Norfolk, Va.	22	19	24	11	n. 77 e.	13	Missouri Valley.							
South Atlantic States.								89	Columbia, Mo.	7	14	11	11	... s.	7
19	Charlotte, N. C.	9	32	16	20	s. 10 w.	23	90	Kansas City, Mo.	20	24	9	24	s. 75 w.	16
20	Hatteras, N. C.	26	16	14	20	n. 31 w.	12	91	Springfield, Mo.	13	29	19	12	s. 24 e.	18
21	Kittyhawk, N. C.	23	20	14	17	n. 45 w.	4	92	Omaha, Nebr.	18	22	14	25	s. 70 w.	12
22	Raleigh, N. C.	18	25	13	21	s. 49 w.	11	93	Valentine, Nebr.	25	16	6	25	n. 65 w.	21
23	Southport, N. C.	17	19	10	28	s. 84 w.	18	94	Sioux City, Iowa	22	21	12	21	n. 84 w.	9
24	Wilmington, N. C.	17	28	14	18	s. 20 w.	12	95	Pierre, S. Dak.	23	15	17	23	n. 37 w.	10
25	Charleston, S. C.	14	27	11	24	s. 45 w.	18	96	Huron, S. Dak.	25	16	13	25	n. 53 w.	15
26	Augusta, Ga.	16	23	15	25	s. 55 w.	12	Northern Slope.							
27	Savannah, Ga.	16	33	9	15	s. 19 w.	18	98	Havre, Mont.	19	17	8	33	n. 85 w.	25
28	Jacksonville, Fla.	17	20	20	13	s. 38 e.	11	99	Miles City, Mont.	18	22	10	27	s. 77 w.	18
Florida Peninsula.								100	Helena, Mont.	9	28	2	40	s. 63 w.	42
29	Jupiter, Fla.	15	24	21	16	s. 29 e.	10	101	Rapid City, S. Dak.	26	15	8	20	n. 47 w.	16
30	Key West, Fla.	13	11	43	3	n. 87 e.	40	102	Cheyenne, Wyo.	23	15	1	34	n. 76 w.	34
31	Tampa, Fla.	17	16	19	21	n. 79 w.	5	103	Lander, Wyo.	13	18	5	34	s. 80 w.	29
32	Titusville, Fla.	13	24	23	17	s. 29 e.	12	104	Kearney, Nebr.	20	18	11	21	n. 79 w.	10
Eastern Gulf States.								105	North Platte, Nebr.	18	23	9	25	s. 73 w.	17
33	Atlanta, Ga.	16	24	12	22	s. 51 w.	13	Middle Slope.							
34	Pensacola, Fla.	21	26	18	12	s. 50 e.	8	106	Colorado Springs, Colo.	32	16	10	10	... s.	16
35	Mobile, Ala.	21	26	13	9	s. 27 e.	9	107	Denver, Colo.	17	28	18	18	... s.	11
36	Montgomery, Ala.	15	24	16	17	s. 6 w.	9	108	Pikes Peak, Colo.	17	11	2	42	n. 81 w.	40
37	Meridian, Miss.	17	29	19	7	s. 45 e.	17	109	Pueblo, Colo.	10	12	21	25	s. 74 w.	7
38	Vicksburg, Miss.	13	31	27	8	s. 47 e.	26	110	Concordia, Kans.	21	25	9	15	s. 56 w.	7
39	New Orleans, La.	18	31	26	3	s. 61 e.	26	111	Dodge City, Kans.	14	25	19	9	s. 84 e.	10
Western Gulf States.								112	Wichita, Kans.	21	29	11	9	s. 14 e.	8
40	Shreveport, La.	14	35	21	8	s. 31 e.	25	113	Oklahoma, Okla.	22	29	16	10	s. 41 e.	9
41	Fort Smith, Ark.	16	14	34	8	n. 86 e.	20	Southern Slope.							
42	Little Rock, Ark.	17	28	16	15	s. 5 e.	11	114	Abilene, Tex.	20	29	15	9	s. 34 e.	11
43	Corpus Christi, Tex.	17	26	34	3	s. 74 e.	32	115	Amarillo, Tex.	18	30	8	18	s. 40 w.	16
44	Galveston, Tex.	11	34	28	3	s. 47 e.	34	Southern Plateau.							
45	Palestine, Tex.	18	28	17	12	s. 27 e.	11	116	El Paso, Tex.	22	7	10	39	n. 62 w.	33
46	San Antonio, Tex.	18	22	29	8	s. 79 e.	21	117	Santa Fe, N. Mex.	20	23	16	22	s. 63 w.	7
Ohio Valley and Tennessee.								118	Tucson, Ariz.	13	28	17	21	s. 15 w.	16
47	Chattanooga, Tenn.	18	27	17	20	s. 18 w.	10	119	Yuma, Ariz.	27	15	11	23	n. 45 w.	17
48	Knoxville, Tenn.	21	21	12	26	... w.	14	120	Keeler, Cal.	19	15	22	20	n. 27 e.	4
49	Memphis, Tenn.	16	30	21	13	s. 30 e.	16	Middle Plateau.							
50	Nashville, Tenn.	16	27	23	14	s. 39 e.	19	121	Winnemucca, Nev.	11	25	9	35	s. 62 w.	30
51	Lexington, Ky.	18	26	12	29	s. 65 w.	16	122	Salt Lake City, Utah	18	20	17	23	s. 72 w.	6
52	Louisville, Ky.	13	29	18	19	s. 3 w.	10	Northern Plateau.							
53	Indianapolis, Ind.	8	31	15	21	s. 15 w.	24	123	Baker City, Oreg.	18	26	21	23	s. 14 w.	8
54	Cincinnati, Ohio	11	27	19	22	s. 11 w.	16	124	Idaho Falls, Idaho	9	39	13	15	s. 4 w.	30
55	Columbus, Ohio	15	26	10	25	s. 56 w.	19	125	Spokane, Wash.	4	35	17	20	s. 5 w.	34
56	Pittsburg, Pa.	19	22	11	27	s. 79 w.	16	126	Walla Walla, Wash.	9	36	8	19	s. 22 w.	29
57	Parkersburg, W. Va.	4	27	18	23	s. 12 w.	24	North Pacific Coast Region.							
Lower Lake Region.								127	Fort Canby, Wash.	14	15	20	23	s. 72 w.	3
58	Buffalo, N. Y.	13	20	13	31	s. 69 w.	19	128	Olympia, Wash.	11	35	3	19	s. 34 w.	39
59	Oswego, N. Y.	11	31	15	18	s. 9 w.	20	129	Port Angeles, Wash.	5	31	13	20	s. 15 w.	27
60	Rochester, N. Y.	7	32	13	29	s. 33 w.	30	130	Seattle, Wash.	10	28	21	9	s. 34 e.	22
61	Erie, Pa.	12	27	8	27	s. 52 w.	24	131	Tatoosh Island, Wash.	3	19	25	25	... s.	16
62	Cleveland, Ohio	11	27	22	20	s. 7 e.	16	132	Portland, Oreg.	15	26	9	24	s. 49 w.	20
63	Sandusky, Ohio	10	26	11	22	s. 34 w.	19	133	Roseburg, Oreg.	13	21	21	22	s. 7 w.	8
64	Toledo, Ohio	11	23	12	31	s. 58 w.	22	Middle Pacific Coast Region.							
65	Detroit, Mich.	11	23	12	34	s. 61 w.	25	134	Eureka, Cal.	23	26	8	17	s. 72 w.	10
Upper Lake Region.								135	Red Bluff, Cal.	18	24	14	27	s. 65 w.	14
66	Alpena, Mich.	14	26	14	21	s. 30 w.	14	136	Sacramento, Cal.	16	32	8	22	s. 41 w.	21
67	Grand Haven, Mich.	16	24	15	20	s. 32 w.	9	137	San Francisco, Cal.	6	31	7	38	s. 51 w.	40
68	Marquette, Mich.	20	20	14	23	... w.	9	South Pacific Coast Region.							
69	Port Huron, Mich.	13	27	10	24	s. 45 w.	20	138	Fresno, Cal.	33	6	11	34	n. 40 w.	36
70	Sault Ste. Marie, Mich.	13	21	26	19	s. 41 e.	11	139	Los Angeles, Cal.	18	10	17	30	n. 58 w.	15
71	Chicago, Ill.	14	27	11	27	s. 51 w.	21	140	San Diego, Cal.	20	12	9	34	n. 72 w.	26
72	Milwaukee, Wis.	13	23	13	26	s. 52 w.	16								

Chart I. Tracks of

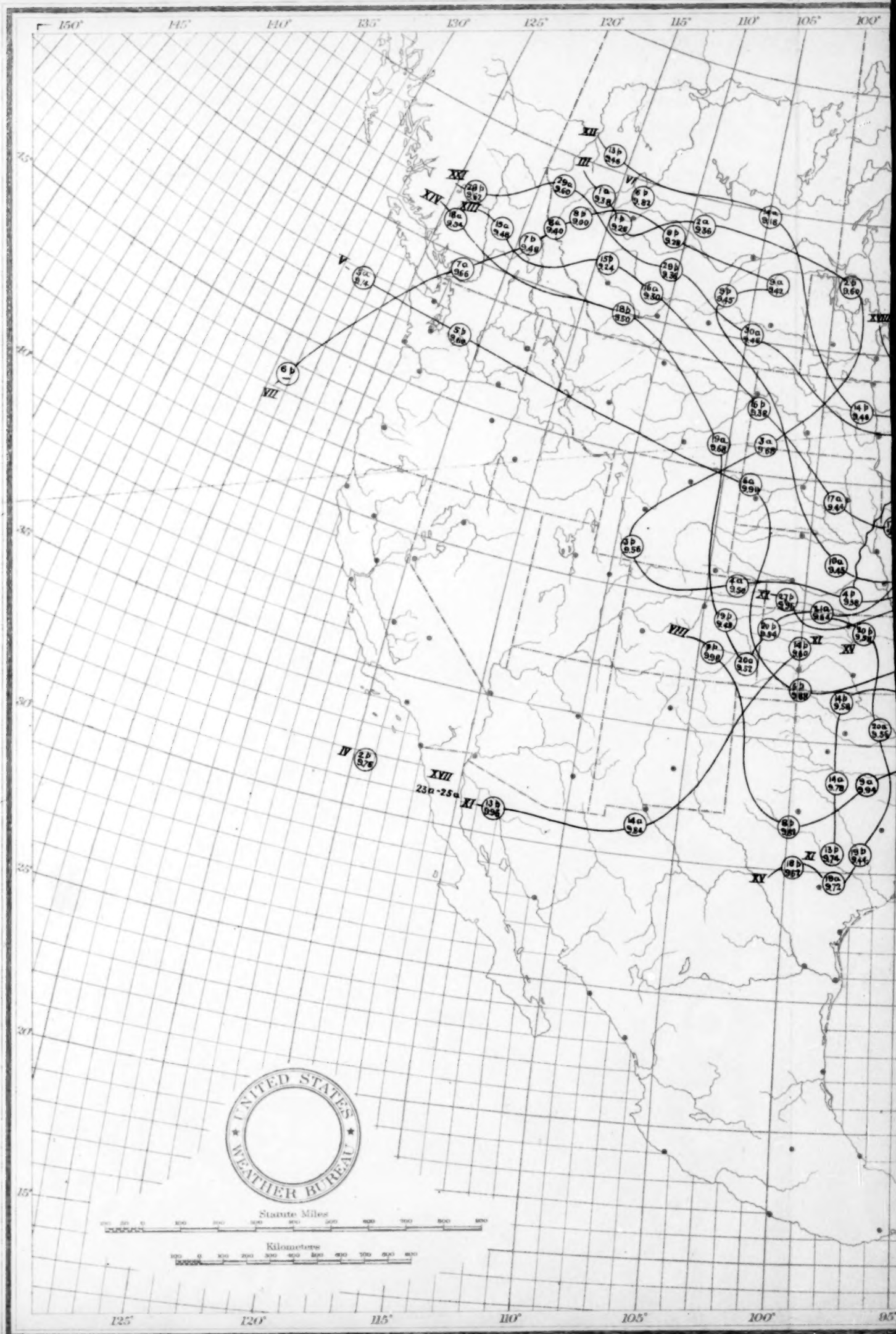
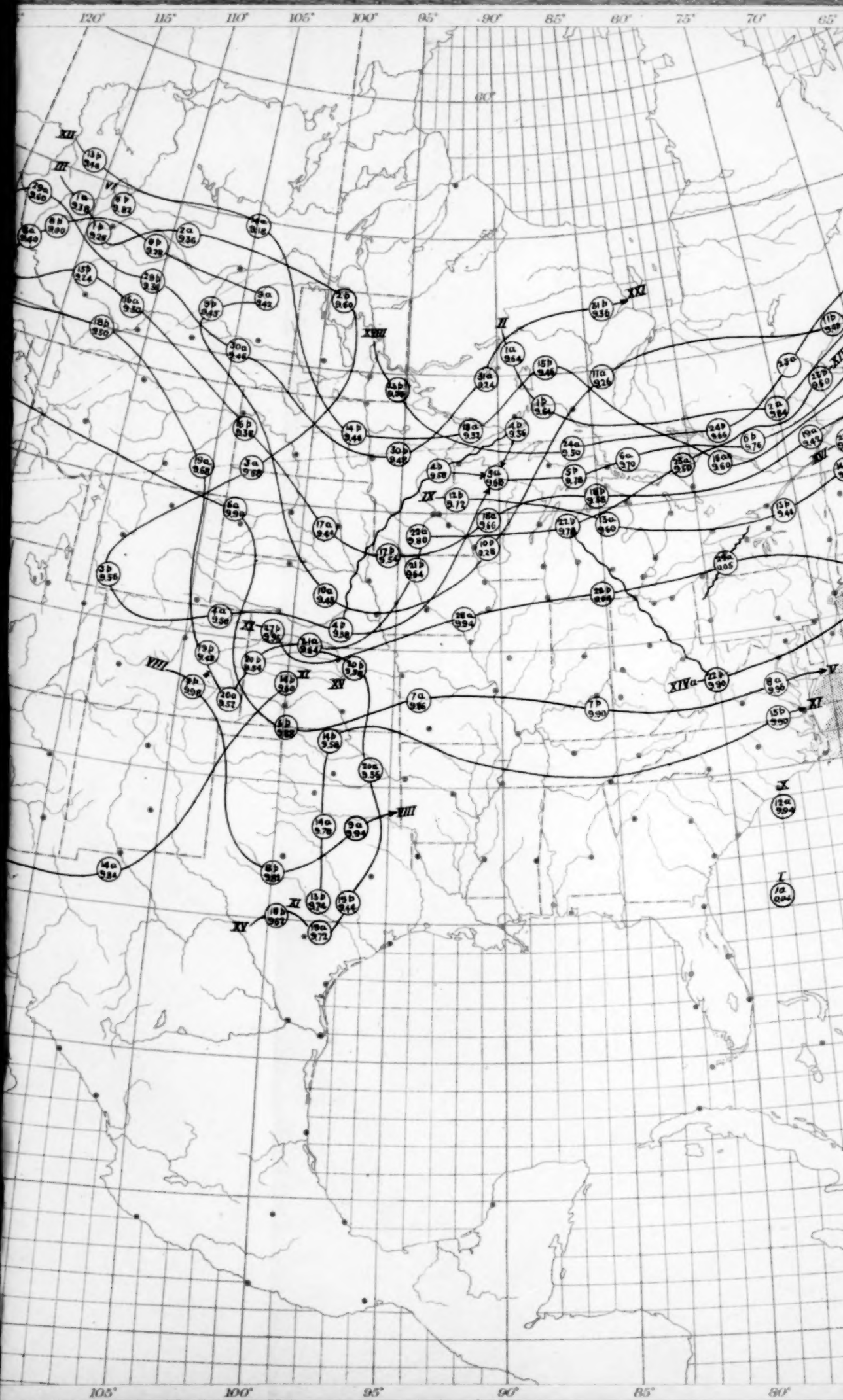
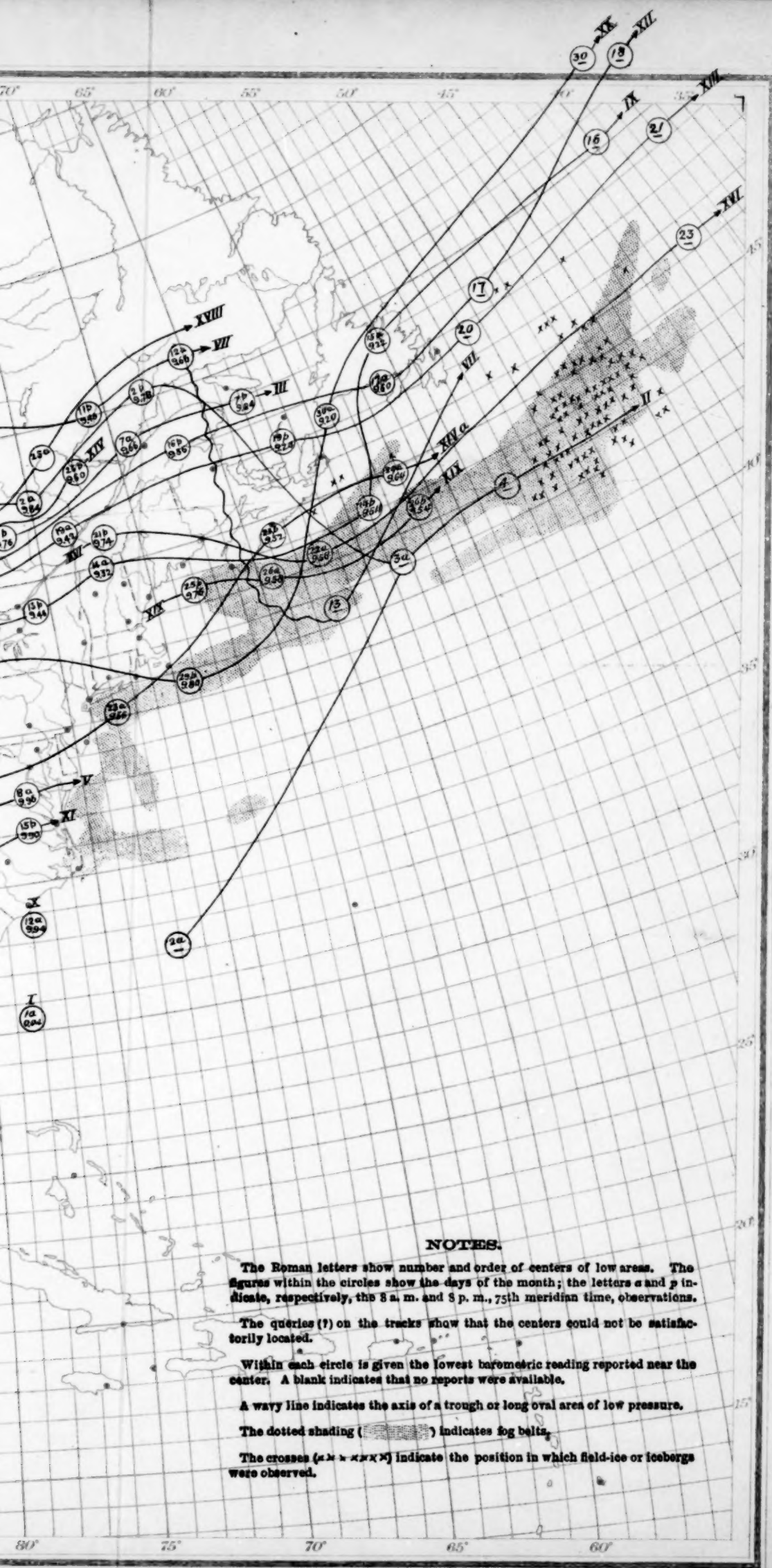


Chart I. Tracks of Centers of Low Areas. March, 1894.





NOTES.

The Roman letters show number and order of centers of low areas. The figures within the circles show the days of the month; the letters s and p indicate, respectively, the 8 a. m. and 8 p. m., 75th meridian time, observations.

The queries (?) on the tracks show that the centers could not be satisfactorily located.

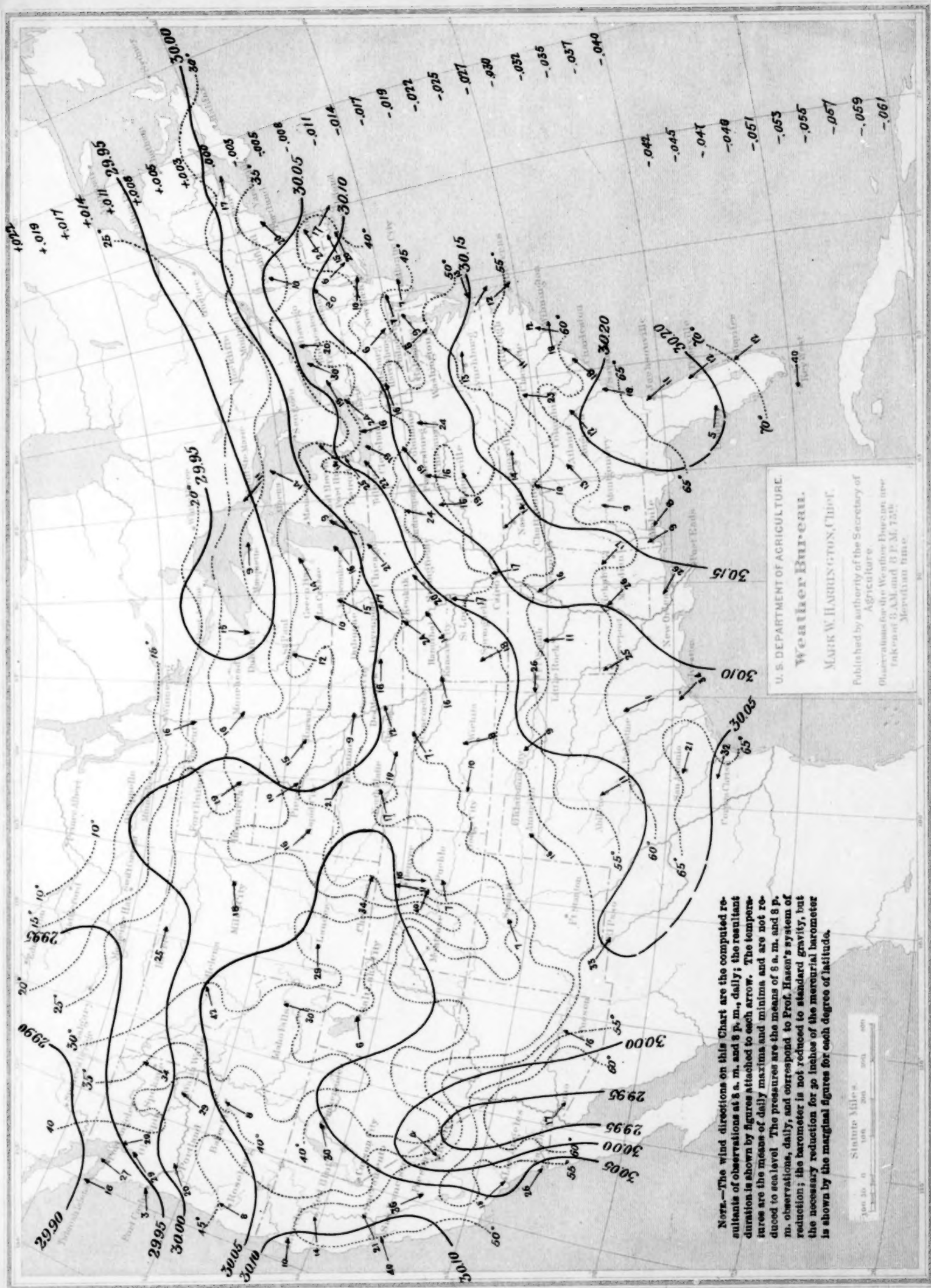
Within each circle is given the lowest barometric reading reported near the center. A blank indicates that no reports were available.

A wavy line indicates the axis of a trough or long oval area of low pressure.

The dotted shading () indicates fog belts.

The crosses (x x x x) indicate the position in which field-ice or icebergs were observed.

Chart II. Isobars, Isotherms, and Resultant Winds. March, 1894.



Note.—The wind directions on this Chart are the computed resultants of observations at 8 a. m. and 8 p. m., daily; the resultant direction is shown by figures attached to each arrow. The temperatures are the means of daily maxima and minima and are not reduced to sea level. The pressures are the means of 8 a. m. and 8 p. m. observations, daily, and correspond to Prof. Hasen's system of reduction; the barometer is not reduced to standard gravity, but the necessary reduction for 30 inches of the mercurial barometer is shown by the marginal figures for each degree of latitude.

U. S. DEPARTMENT OF AGRICULTURE.
WEATHER BUREAU.
MARK W. HARRINGTON, Chief.

Published by authority of the Secretary of Agriculture.
Observations for the Weather Bureau are taken
between 5 A.M. and 6 P.M. 12th
Meridian time.

Chart III. Total Precipitation. March, 1894.

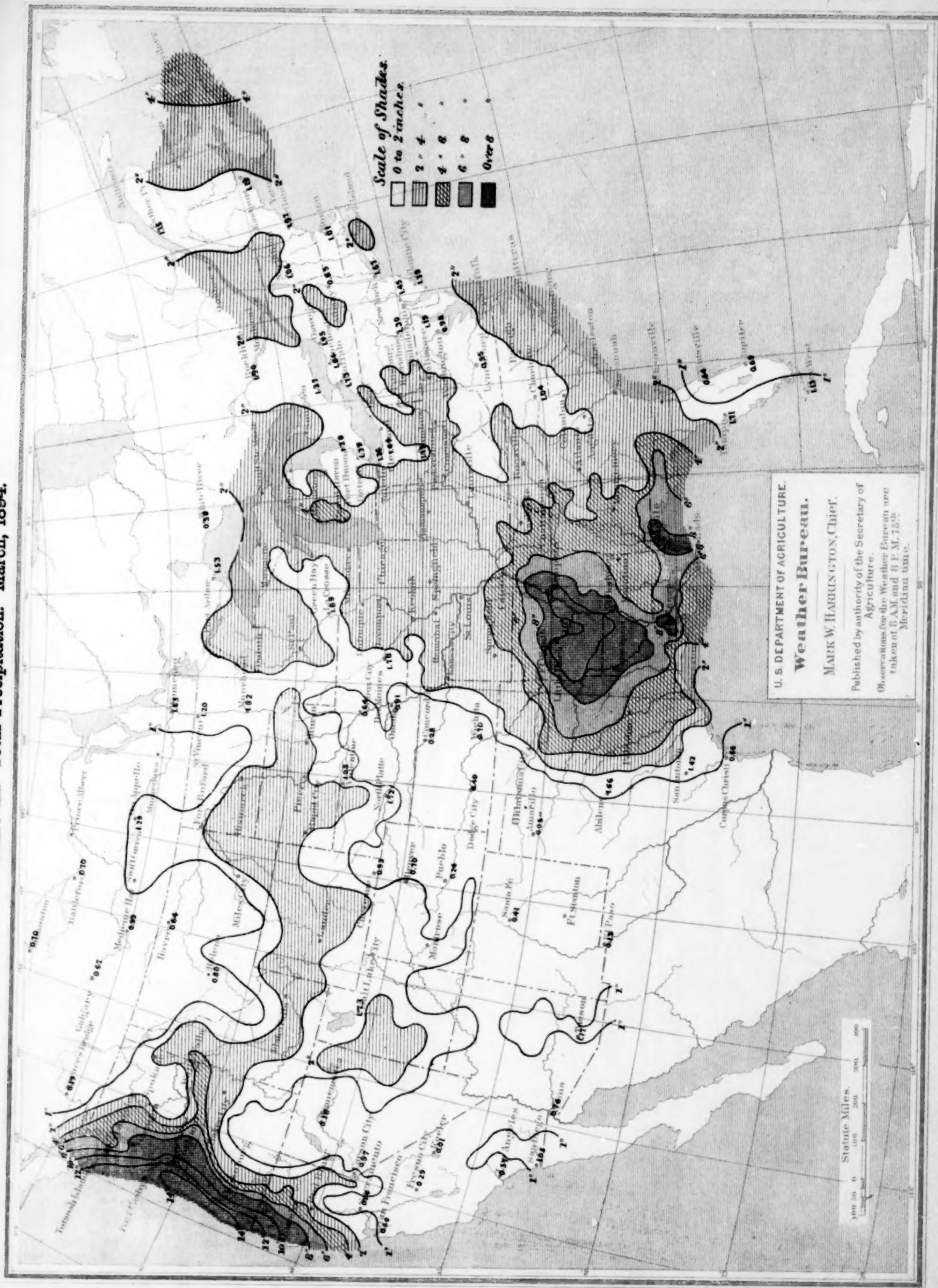
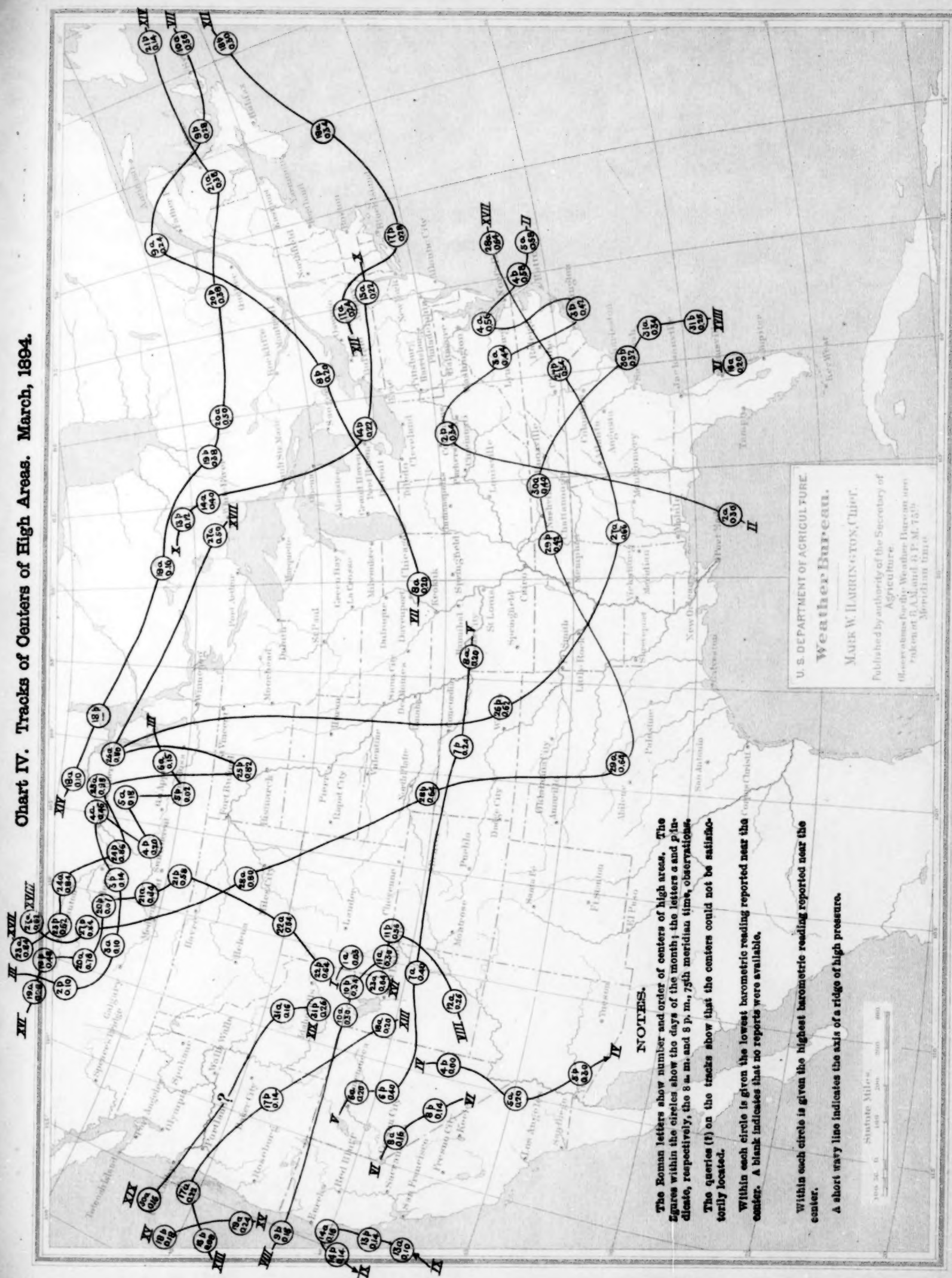


Chart IV. Tracks of Centers of High Areas. March, 1894.



NOTES.

The Roman letters show number and order of centers of high areas. The figures within the circles show the days of the month; the letters a and p indicate, respectively, the 8 a. m. and 8 p. m., 75th meridian time, observations. The queries (?) on the tracks show that the centers could not be satisfactorily located.

Within each circle is given the lowest barometric reading reported near the center. A blank indicates that no reports were available.

Within each circle is given the highest barometric reading reported near the center.

A short wavy line indicates the axis of a ridge of high pressure.

U. S. DEPARTMENT OF AGRICULTURE

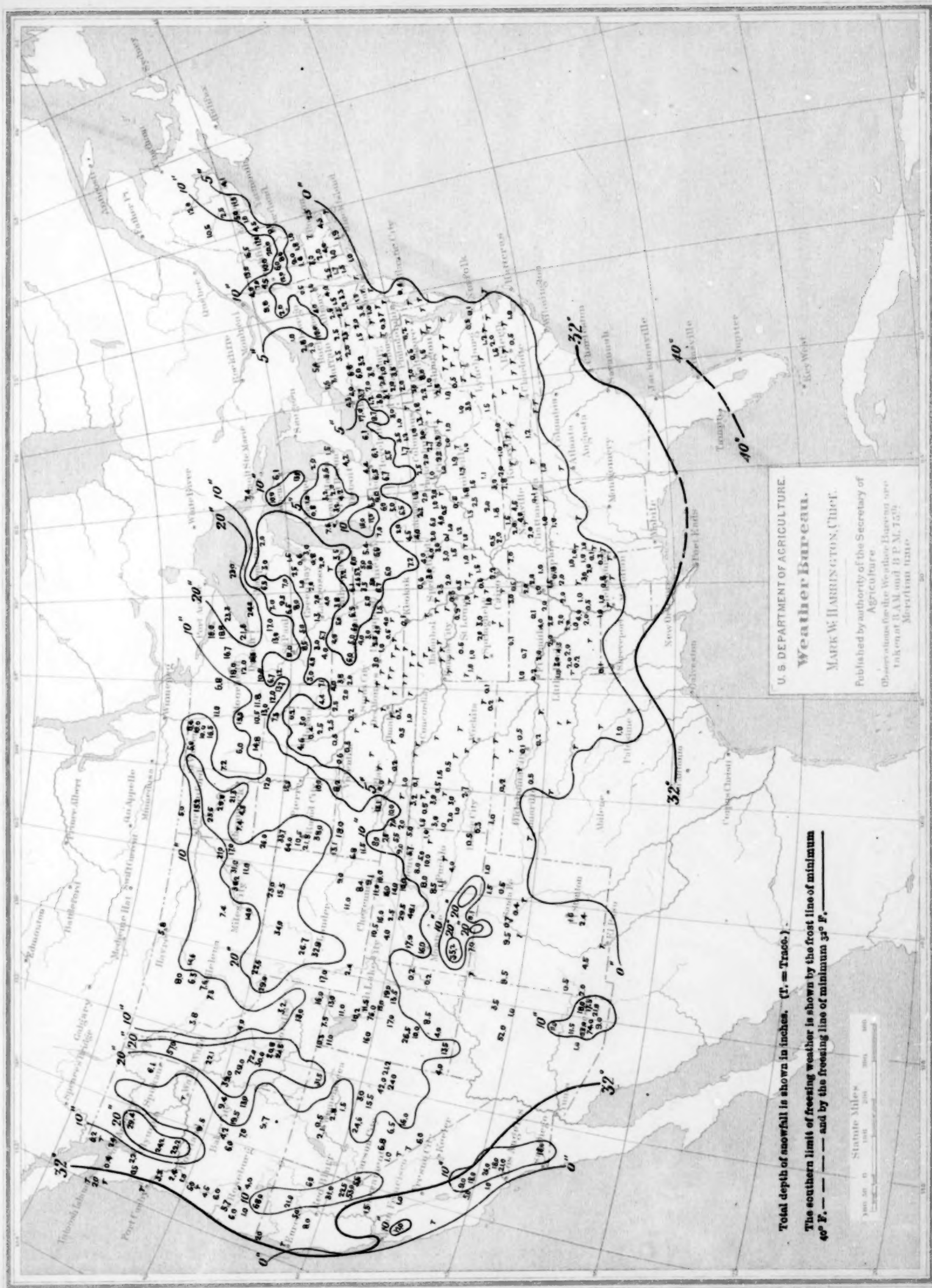
Weather Bureau.

MAKER W. HARRINGTON, Chief.

Published by authority of the Secretary of Agriculture

(Observations from the Weather Bureau are taken at 6 A. M. and 6 P. M. 75th meridian time)

Chart V. Depth of Snowfall (inches) and Limits of Freezing Weather. March, 1894.



Total depth of snowfall is shown in inches. (T. = Trace.)

The southern limit of freezing weather is shown by the frost line of minimum 40° F. — — — — and by the freezing line of minimum 32° F. —

Scale in Statute Miles

0 10 20 30 40 50 60 70 80 90 100

U. S. DEPARTMENT OF AGRICULTURE

Weather Bureau.

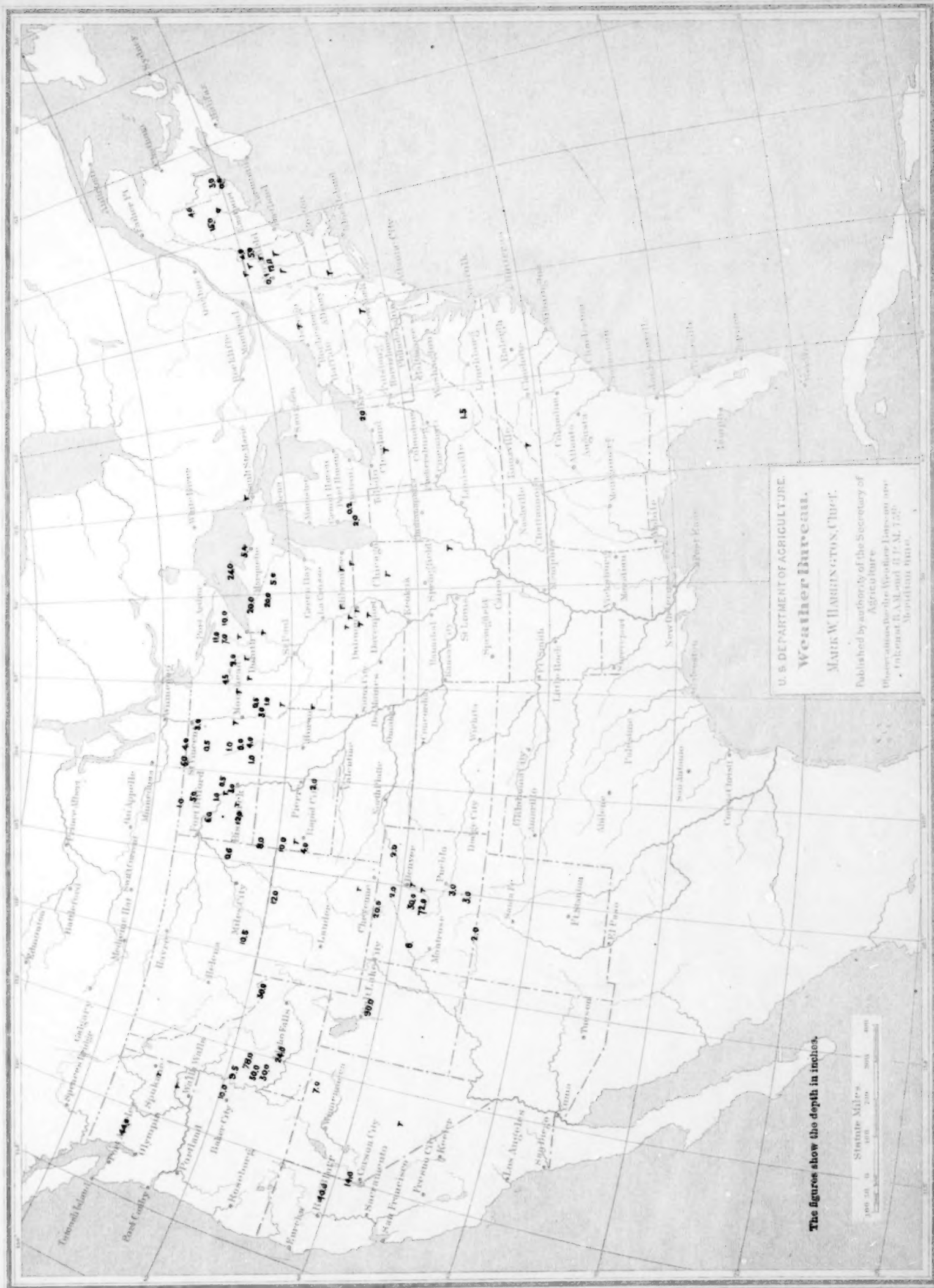
MARK W. HARRINGTON, Chief.

Published by authority of the Secretary of Agriculture

Observations for the Weather Bureau are taken at 8 A.M. and 8 P.M. 15th

Meridian time

Chart VI. Depth of Snow lying on ground March 31, 1894.



U. S. DEPARTMENT OF AGRICULTURE.
Weather Bureau.
 MARK W. HARRINGTON, Chief.
 Published by authority of the Secretary of Agriculture.
 (These are the Weather Bureau maps taken at 11 A.M. and 11 P.M. 1894.)

The figures show the depth in inches.

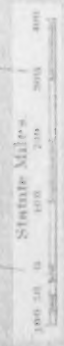


Chart VII. Departures from Normal Temperatures for the seven days, March 25 to 31, 1894, inclusive.

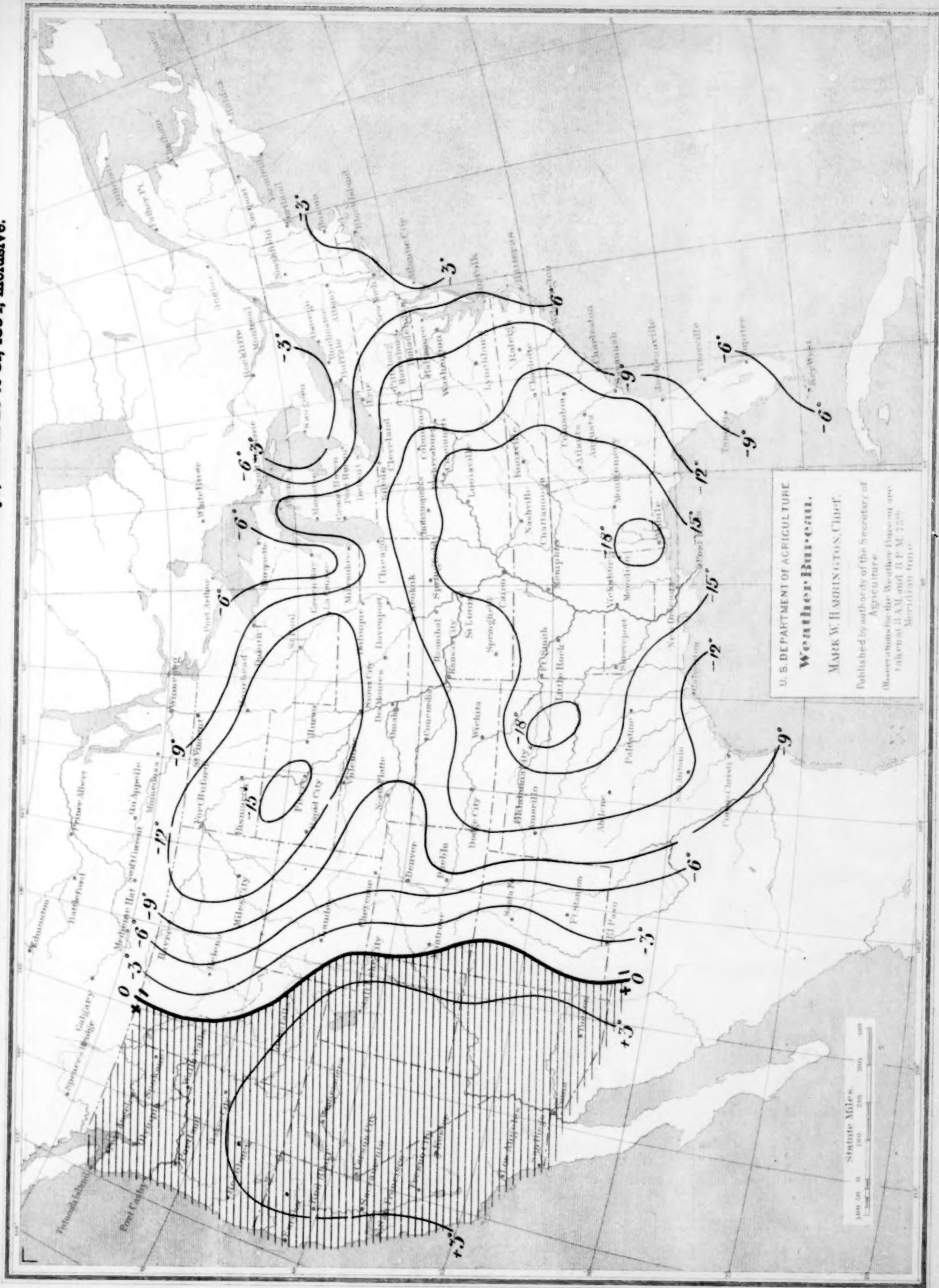
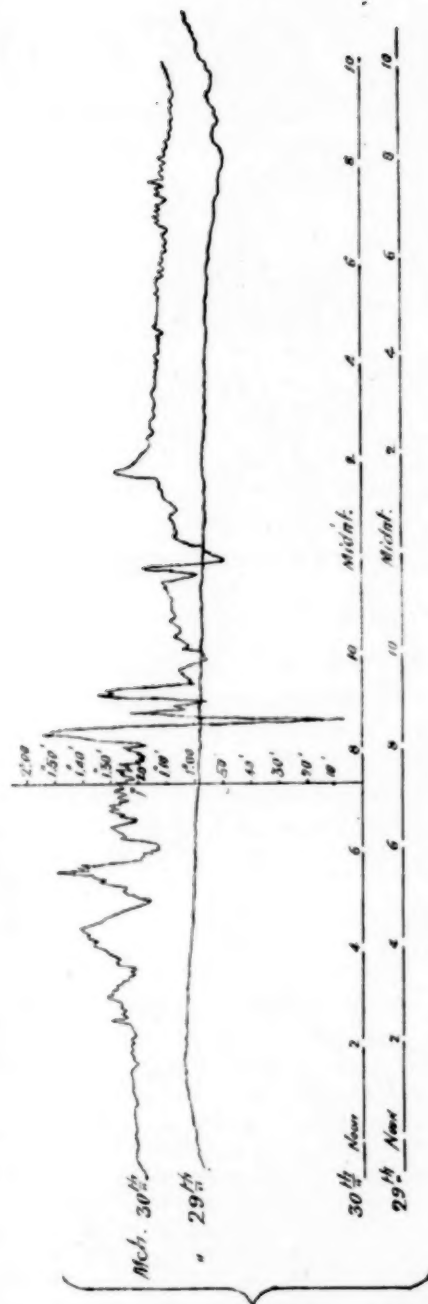
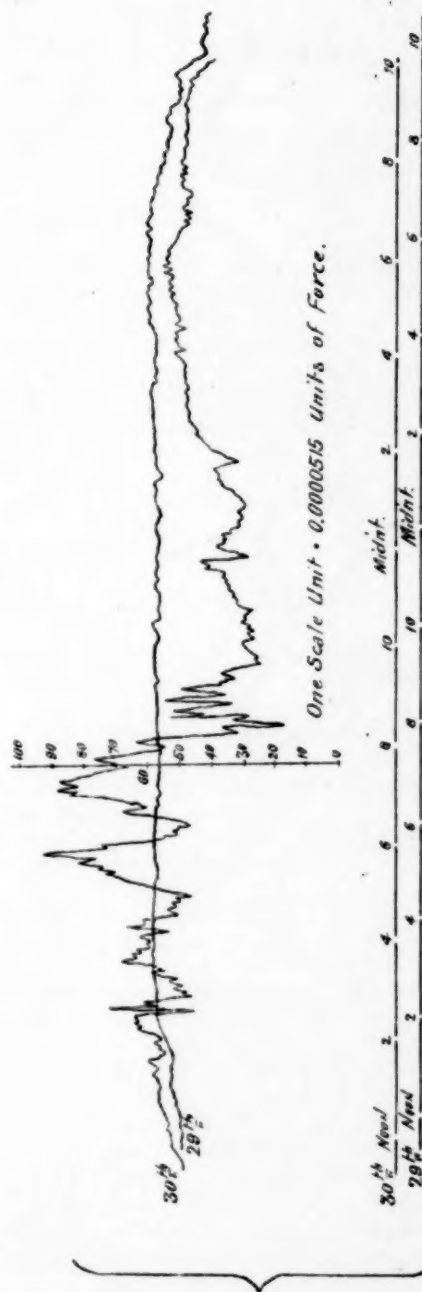


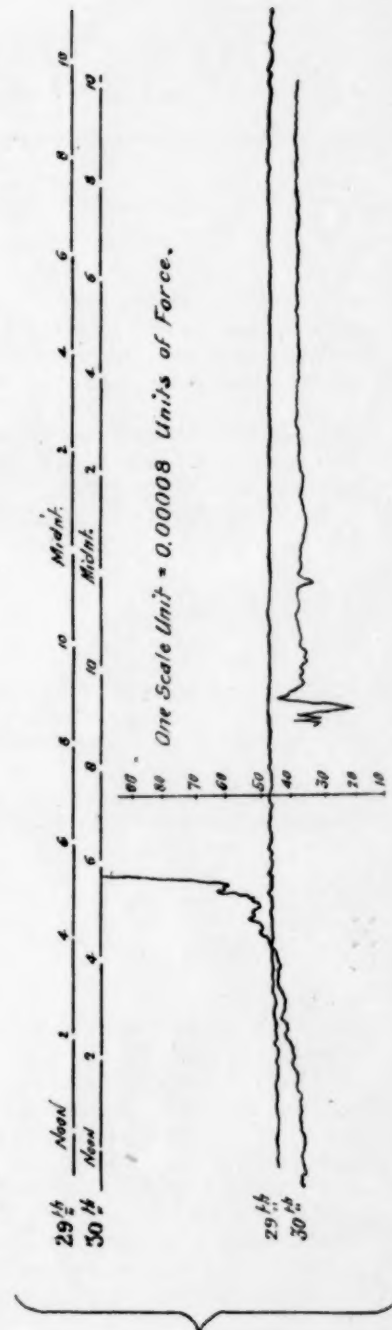
Chart VIII. Magnetic Storm of March 29-30, 1894.
Recorded at U. S. Naval Observatory, Washington, D. C.



Declination



Horizontal Force



Vertical Force